April 2019 Volume 144 Number 1100

The Naturalist

Yorkshire Naturalists' Union

Journal of Natural History for the North of England

The Naturalist

Vol. 144 No. 1100 April 2019

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An asterisk* indicates a peer-reviewed paper

Front cover: *Phyllonorycter lautella*, a micromoth a mere 4mm long, reared from a leaf mine on Pedunculate Oak *Quercus robur* (see p.49). Photo: *Andy Nunn*

Back cover: Three of the seven students who received free tickets and attended the YNU Conference in York on April 6th 2019 thanks to NatureHack/Lottery funding, a succesful initiative to engage younger people. Photo: *Clare Langrick*

The Naturalist

The Alpine Newts of Coatham Wood

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Introduction

Coatham Wood is a commercial woodland owned and manged by the Forestry Commission (FC). The woodland is mixed with areas of hardwood, pine and poplar with most of the woodland being planted in the early 2000s in an area that was previously under agriculture. There are several ponds which were created by FC as part of its commitment to improving the biosecurity value of its land holdings. Coatham Beck runs through the middle of the woodland and joins Lustrum Beck in Stockton-on-Tees. The becks form part of the Tees catchment.

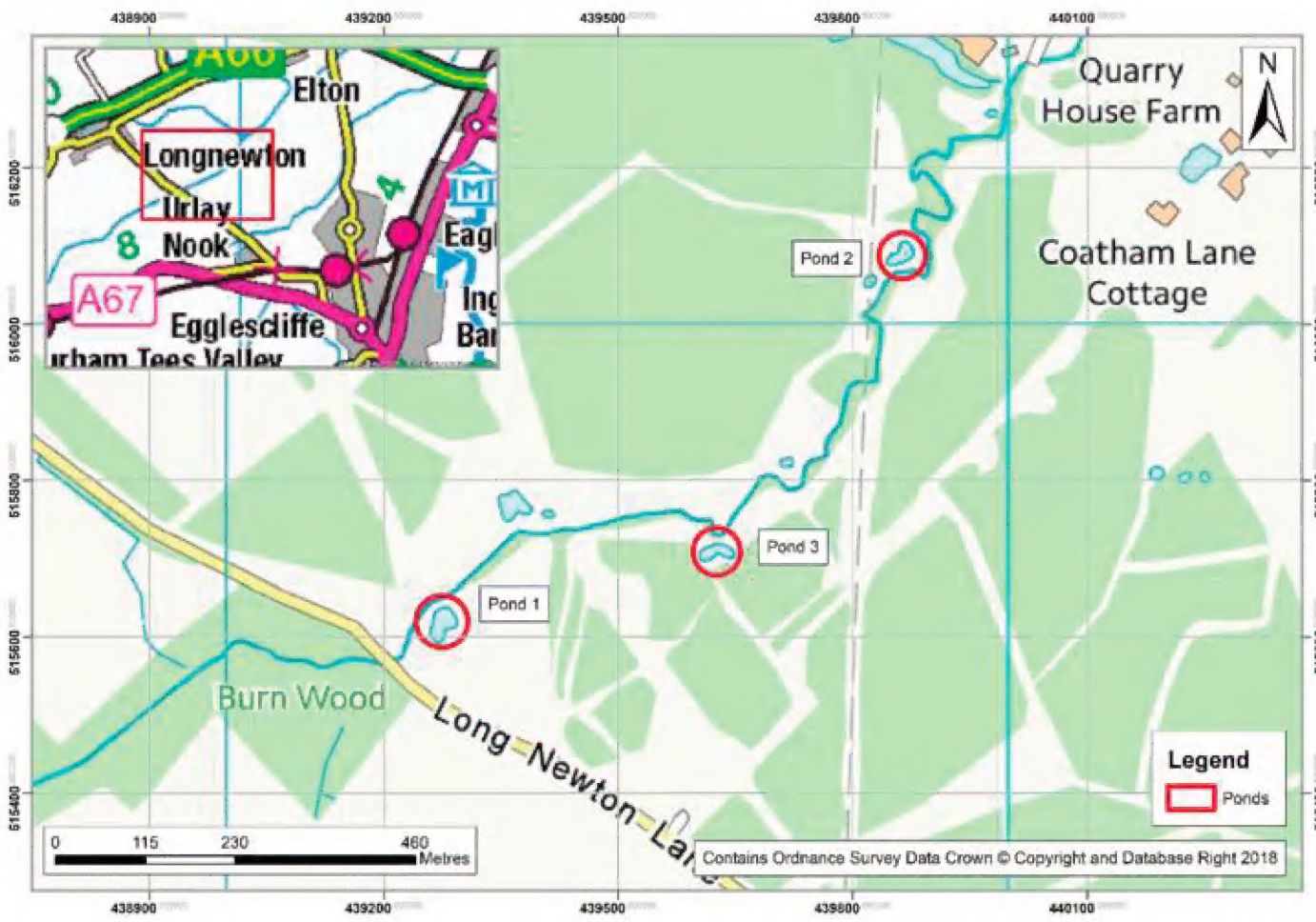

Figure 1. Location of the ponds included in the survey.

Some ponds were specifically created as receptor ponds for part of a Great Crested Newt *Triturus cristatus* translocation for a development at Allens West (Skinner, 2012). There is a management plan in place for the water bodies and adjacent terrestrial habitat. It is not clear if Great Crested Newts were present at the site before this translocation but there are records that predate the ponds from the wider area (e.g. Eaglescliffe Brick Ponds and Carter Moor in the 1980s).

Naturalised populations of Alpine Newts ***Ichthyosaura alpestris*** have been known in Eaglescliffe (the closest town south of Coatham Wood) since the late 1990s and were present in Coatham Wood in 2008 (Bond & Haycock, 2008), as well as in two nearby sites within 2km: Eliff's Mill and a private nature reserve. Skinner (***op. cit.***) shows that Alpine Newts were present in the former Ministry of Defence (MOD) land between Eaglescliffe and Coatham Wood, and this probably corresponds to the population at Uraly Nook discussed by Bond (undated). Data held by the Environmental Records Information Centre North East includes records of Alpine Newts in Coatham Wood from 2015 and 2016. Bond & Haycock (**op. cit.**) speculate that the Alpine Newts in Coatham Wood were imported as eggs on vegetation during the stocking of ponds, although they do not rule out natural colonisation from the existing suburban population.

There has been much concern over the presence of wild populations of Alpine Newts because research shows that in the UK there is a higher incidence of chytrid fungus *Bactrachocytrium dendrobatidis* in ponds with non-native amphibians (Cunningham & Minting, 2008).

Evidence of the co-existence of these two newts is uncommon in the literature. Beebee (2013) reports co-existence of all native amphibians in his garden pond, although speculates that the long-term decline of Great Crested Newts might be a result of competition with Alpine Newts. Bond & Haycock (*op. cit.*) give details of only one site in the north of England where Alpine and Great Crested Newts were co-existing near Sheffield.

Methods

Study site

All three ponds included in this study were located close to Coatham Beck in the central part of Coatham Wood. The location of the ponds is shown in Figure 1 (p1).

Pond 1, the most westerly, is c.650m^2 and receives surface and ground water from the hillside to the south. It is largely unshaded, with a few young Alder trees *Alnus glutinosa* shading around 5% of the pond margin. Aquatic macrophytes are common on the northern shoreline of the pond with extensive areas of Water-cress *Nasturtium officinale* and some stands of Bulrush *Typha latifolia*. The southern shoreline is largely devoid of vegetation except some marginal Soft-rush *Juncus effusus*.

Pond 2 is located north of Coatham Beck and the presence of Stone Loach *Barbatula barbatula* suggests that it occasionally receives water during flood events. The pond is 550m^2 and has a small island in the centre. The eastern part of the pond has a dense stand of Bulrush and the main part of the pond has a large population of Water-soldier *Stratioties aloides*.

Pond 3 is located south of Coatham Beck and also receives surface and ground water from the hillside to the south. It is 280m^2 and is significantly shaded by an adjacent poplar plantation and

willows. The pond has dense growths of the invasive New Zealand Pygmyweed *Crassula helmsii* and some areas of Bulrush.

Survey methods

Ponds were surveyed using visual counts of all amphibians using million candlepower Cluson Clulite torches, allowing 15 minutes per 50m of shoreline (English Nature, 2001). Surveys started around 30 minutes after sunset and continued until all ponds had been assessed. Surveys were led by the authors, who all hold the Natural England class licence CL-08 to survey for Great Crested Newts. Six surveys were carried out in April and May 2018, each following best-practice biosecurity measures (ARGUK 2017). During each of the surveys the weather was dry and sufficiently warm for newts to be active. Access was possible to over 90% of the shoreline of all three ponds, and this was consistent throughout all surveys. Torching was limited in areas of denser macrophyte vegetation but sufficient visibility was possible to identify most newts seen. Torchlight surveys are only expected to record between 2% and 50% of the total population of Great Crested Newts in a pond (English Nature, 2001), although no comparable figure is available for Alpine Newts. The final counts will therefore represent an underestimate of the total populations of newts in these ponds.

Results

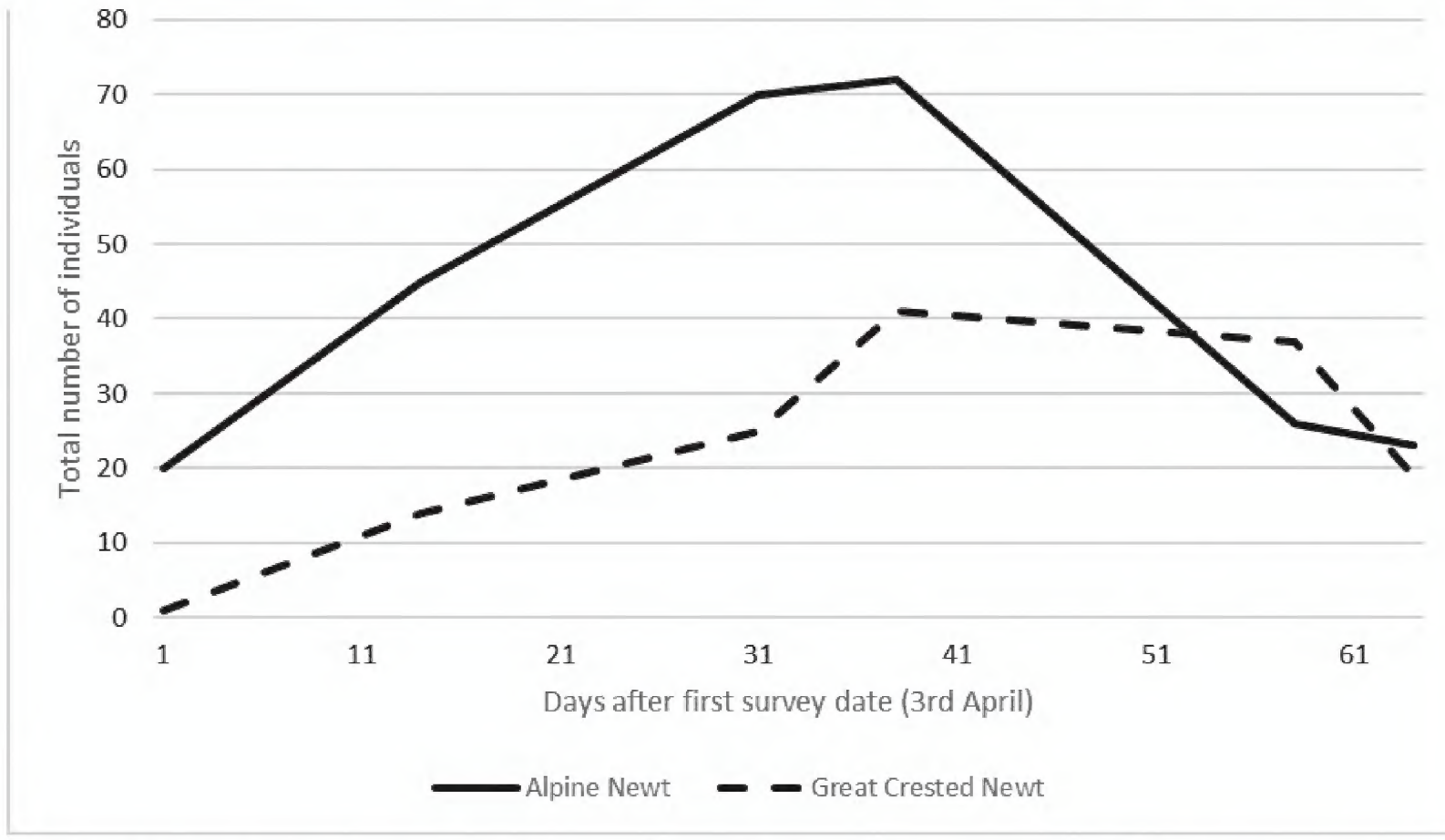

Figure 2. The total count of Alpine and Great Crested Newts combined for the three ponds included in the study.

The Alpine Newts were confirmed in the three study ponds in Coatham Wood, showing that they have persisted since they were last documented at the site in 2008. The population count over the three ponds peaked at 72 on 10 May. The largest population was in pond 1, in which 51 Alpine Newts were counted. Great Crested Newts were also confirmed in all three ponds, although only a single newt was found in pond 3- the presence of predatory fish might explain

the low numbers of Great Crested Newts using this pond. The Great Crested Newt count peaked at 41 on 10 May, with 38 of these found in pond 1. This population would therefore represent a 'medium' population (English Nature, 2001). For both species the total number of individuals recorded grew steadily through the survey period until mid-May then declined steadily (Figure 2, p3). This is consistent with known behaviour of newts during the breeding period (English Nature, **op. cit.**; Beebee, **op. cit.**).

In pond 1, with the largest population of both Alpine and Great Crested Newts, some microhabitat variation was observed. The Alpine Newts were more consistently found in the vegetated areas around the northern margin of the pond. Great Crested Newts were typically observed in clear, deeper water towards the middle of the pond. There was some overlap, with individuals of both species being found in the other microhabitat.

Only small numbers of Smooth Newts *Lissotrition vulgaris* were recorded, with the most being found in Pond 3 in areas of shallow water by the margins that appear to provide a refuge from fish. Large numbers of Common Toad *Bufo bufo* were present in ponds 1 and 3. Numbers of adult toads declined significantly in May, as would be expected.

Discussion

It appears that Alpine Newts and Great Crested Newts are able to co-exist in a plantation woodland setting in the UK. Both displayed similar population dynamics in the breeding period, although the total population of Alpine Newts was almost double that of the Great Crested Newts. Within the largest pond there appeared to be some microhabitat variation in terms of areas of the pond used by the two species, at least in the early evening survey period, although this is an anecdotal observation and requires further investigation.

There was no evidence of disease in any of the amphibians seen during the survey. Perhaps the long establishment of Alpine Newts in this area means that chytrid (and other diseases prevalent in the aquatic pet trade) is less of an issue than with new stock introduced to ponds with native amphibians. Common Toads are particularly susceptible, so the large numbers of Common Toads recorded during the surveys are reassuring (Cunningham & Minting, *ibid*.). However, the current absence of disease does not imply future security from infection and it is beyond the scope of this paper to understand if the presence of Alpine Newts increases vulnerability to future disease spread.

Alpine Newts have persisted in Coatham Wood since 2008 and the breeding population appears to be strong in terms of overall numbers. Evidence from the literature suggests they have been found in a good number of places within *c*.2km of Eaglescliffe where targeted surveys have been completed. The local landscape has scattered ponds and reservoirs although the River Tees, and A66 and A67 roads might provide natural barriers to the migration of these newts.

The Great Crested Newt population in Coatham Wood is well-established, showing the effectiveness of the programme of pond creation in the wood. The steadily increasing numbers recorded in the pond between April and May is consistent with a slightly late 2018 peak in breeding, most likely resulting from the exceptionally cold weather in March ("Beast from the East"). The presence of Alpine Newts does not appear to have adversely affected the Great Crested Newts, with a 'medium population' (English Nature, *op. cit.*) recorded over the three study ponds. The low

number of Smooth Newts may be a result of competition with the Alpine Newts and further investigation would be needed to see if this is the case.

Coatham Wood provides an interesting site to study the interaction of native and non-native amphibians, given the variety of ponds in a semi-natural setting, and it is hoped this paper will encourage further investigation at this site.

Figure 3. Male (left) and female (right) Alpine Newts in Pond 1 on 3 April.

Acknowledgements

The authors are grateful to the Environment Agency, especially Ian Marshall, who funded and assisted with the field work. The authors are also grateful to the Forestry Commission for permission to survey the ponds, and the work was carried out under the Forestry Commission permit ENV.2.6.2 – AP01/2018. The authors are also grateful to Environmental Records Information Centre North East for providing historic records of Alpine Newts.

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Notes on the sub-family Hydrophorinae (Diptera Dolichopodidae) in Yorkshire

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In Britain the dolichopodid fly sub-family Hydrophorinae comprises eight genera: *Aphrosylus, Hydrophorus, Liancalus, Machaerium, Orthoceratium, Scellus, Schoenophilus* and *Thinophilus* (Chandler, 1998). There are twenty species overall, of which fourteen have been recorded in Yorkshire. The following accounts summarise the currently known County distribution and status of these (but see Note 1). 'Nationally Rare' and 'Nationally Scarce' statuses are taken from Drake, 2018.

Aphrosylus

Aphrosylus celtiber Hal. Two of the four British *Aphrosylus* species occur in Yorkshire; all four are exclusively coastal. *A. celtiber* was reported from Cayton Bay in July 1995, where it was said to be 'common', and in the following month it was found at Spurn. In 2001 and 2012 large numbers were observed on seaweed on concrete boulders in the inter-tidal zone at Reighton Sands and, also in 2014, on 'old tide-covered concrete blocks at Hilston' on the Holderness coast. A study in Cornwall (Poulding, 1998), showed that the late larval stages of this fly are predators of the sessile barnacle *Chthamalus montagui* and regularly feed on its soft parts.

Aphrosylus ferox Hal.in Walker. The earliest Yorkshire record of *A. ferox* dates from 1952, when a single female was collected from the surface of a salt-water pool at Spurn (Hincks, 1953). Since then, from 1985 onwards, this tiny fly has been found at a number of coastal localities (e.g. Sandsend, Cayton Bay, Hayburn Wyke) and in recent years around the Flamborough headland at Dane's Dyke and South Landing where, at the latter site, large numbers of both sexes were swept over rotting seaweed (Crossley, 2015).

Hydrophorus

There are nine *Hydrophorus* species on the British List, of which seven occur in Yorkshire. Most are associated with the margins of water bodies where they skate on the surface and one in particular, *H. oceanus* Macq., is well-known for 'mate-guarding', of which more later. The first County record for this genus was of *H. nebulosus*, which Chris Cheetham found on Ingleborough in April, 1919.

Hydrophorus albiceps Frey. This is Nationally Scarce and in Yorkshire it is known from three sites on the North York Moors (Fen Bog, Tranmire Bog and Bonfield Gill), singletons having been found at these places since 2002, and at sites in six Pennine hectads, where the first was reported by Cheetham at Helwith Moss (Austwick) on 1 October 1921, and at the same site on 1 May 1936 when he found it to be 'plentiful'. In common with other insects of upland places it is also found on peaty lowland sites such as Skipwith Common and Thorne Moors where, at the latter place, Peter Skidmore reported it as being "abundant" between early July and early October 1969.

Hydrophorus balticus (Mg.) There are only three sites for *H. balticus* on the YNU record card (Manvers and Gypsy Marsh in VC63 and East Keswick Fitts (VC64) in 2005. It is strange there are so few because, starting in 1989 when I found it at Hell Wath (Ripon), I have recorded it from sites in 22 hectads across Yorkshire, from Spurn in the east to Foxglove Covert at Catterick Garrison in the north-west and with no obvious relationship between the habitats. Indeed, in July 2016 this was the only *Hydrophorus* to be found at a linear river-side salt-marsh bordering the Humber upstream from North Ferriby, where *H. oceanus* (Macq.) normally occurs in quantity, but none were found on that occasion.

Hyrophorus bipunctatus (Lehm.) Spurn in 1952 was the site of the first Yorkshire record of *H. bipunctatus* and since then it has been found to be widespread, but localised, across the County with a typically conspicuous absence from Holderness. It is now recorded from sites in 27 hectads, and with no clear habitat association.

Hydrophorus litoreus Fall. Helwith Moss in late March, 1936 provided Cheetham with the first County record of *H. litoreus.* In June 1946 he reported it from Spurn and it was again reported from Spurn in 1952. The next record was in April 1986 from Denaby Ings (VC63). Thereafter it has been recorded mostly in lowland sites around the Lower Derwent Valley, together with a few wetland sites in the south of VC63, and it is now known from 13 hectads in the County.

Hydrophorus nebulosus Fall. Easily identified in the field on account of its mottled wings (see fig. 1a p8), this tiny fly is widespread and often very numerous in damp, peaty places in both upland and lowland localities, where it usually occurs on, or close to, the ground. It has now been reported from sites in 24 hectads across the County, mostly from the Pennines and North York Moors, with lowland sites at Thorne and Hatfield Moors, and Allerthorpe, Skipwith and Strensall Commons. It has a long period of activity, being noted by Cheetham at a VC64 site on 20 November 1926 and 12 February 1927.

Hydrophorus oceanus (Macq.) This coastal fly (fig. 1b, p8) is usually abundant on salt-marshes around Britain, and the fact that it was not recorded in Yorkshire until the Spurn survey undertaken by members and associates of the YNU Entomological Section in the early 1950s is perhaps indicative of the limited facilities for distant travel experienced by past generations. Since the first record in May 1952 of 'a number of both sexes on and around a salt-water pool on the shore' (Hincks, *op. cit.*), it has been found at linear salt-marshes along the north side of the Humber bank as far inland as Brough, and it is often abundant. The flies are often to be seen skating on the water at the outer edge of the marshes and on muddy creeks, and they probably move up and down with the tides. Males are noted for 'mate-guarding', the much smaller males clinging tenaciously to the backs of females for long periods, probably after successful copulation (Dyte, 1988). They will often remain attached when in the sweep-net and even after having

been sucked into a pooter!

Figure 1.
Left: Fig 1a. *Hydrophorus nebulosus* – a tiny fly with conspicuously mottled wings. *P. Cayton*
Right: Fig 1b. *Hydrophorus oceanus* (mate-guarding – even after freeze-killing!). *P. Cayton*

Hydrophorus praecox (Lehm.) The first Yorkshire record was another from the Spurn survey (Hincks *ibid*.), where it was noted in June 1951 and subsequently 'at a pond near the sea'. Since then it has been found at numerous sites in twenty hectads, sixteen of which are east of SE60, but this may be an example of 'collector bias' as most post-1980 records are mine! The YNU record card contains an evocative entry by Peter Skidmore, the recorder for Diptera at the time, 'Thorne Moor, on canal by moor edge – *Phragmites* area on warped peat, several pairs skating over water surface 22.7.79.'

Liancalus

Liancalus virens (Scop.) One of the largest dolichopodid flies, measuring c.7mm in length, this slender metallic fly has been recorded since the early days of dipterology in Yorkshire. The first was from Addingham Moorside on 29 August 1906 and the next from Bow Beck near Ilkley on 28 August 1907 (Ashworth, 1908). Since then it has been found in many localities in the western half of the County and sites in VC62, both inland and coastal, but records are conspicuously scarce from south-east Yorkshire. It was not until 1997 that the first was recorded in VC61 at Sewerby Cliffs, and since then it has been found at two other coastal seepages on the south side of the Flamborough headland. It is likely to occur, as Fonseca (1978) remarks, 'wherever fresh water is trickling down a vertical rock face', to which perhaps should be added 'and where there is a growth of algae'. Recently there has been an interesting report of this species occurring on the wall of the Natural History Museum, South Kensington, where an outside tap appears to have been dripping for several years, encouraging the growth of algae on the adjoining wall (Sivell, 2016). *Liancalus virens* has a long flight period and on 11 October 1987 I was fortunate to witness what appeared to be a mass (?courtship) display on the stonework of the ancient pack-horse bridge which spans the River Washburn at Norwood Bottom, north of Otley (Crossley, 1988). On that occasion I noted 'large numbers of *L. virens*', but on 23 October

'numbers were much reduced'. A photograph showing the tiny clear spots at the tips of the male wings and which are presumably significant in the wing 'whirring' display described in my note, can be seen in the photograph illustrating a recent paper in this Journal (Crossley, 2014a).

Machaerium

Machaerium maritimae Hal.

This coastal fly (Figure 2) was first recorded for Yorkshire in the Spurn report (Hincks, *op. cit.*) where it was described as being 'abundant on the clumps of *Spartina'* on 12 July 1952. Since then its pattern of distribution in Yorkshire follows that of other estuarine and salt-marsh species, occurring in suitable habitats on the north bank of the Humber as far inland as North Ferriby and no doubt beyond if sought in the right places.

Figure 2. *Machaerium maritimae*
P. Cayton

Orthoceratium

Orthoceratium sabulosum (Beck.) is a relatively large, slender-bodied metallic fly and unlikely to be overlooked, but it is apparently a scarce coastal species in Britain. Currently awarded Nationally Scarce status, it was not reported in Yorkshire until 1999, when I found examples of both sexes by sweeping around a damp hollow on the landward edge of the sea-shore at Kilnsea, not far from the Blue Bell car park. By 2001 the site had been destroyed by wave action, but specimens were found that year on the margins of shallow, brackish pools created as 'scrapes' in Clubley's Field north of Warren Cottage. It was recorded there again on 13 September, 2002, since when there have been no further reports, but I have subsequently found singletons on the inner salt-marshes at Rimac and Horse-Shoe Point on the north Lincolnshire coast. As with some other coastal flies there are occasional inland records; for example, a single female was swept in calcareous woodland in North Somerset in August 2001 (Gibbs, 2002). See Note 2.

Scellus

Scellus notatus (Fab.) is another large and distinctive fly, especially the male which has a pair of conspicuous yellow processes at the tip of the abdomen. Both sexes have strong spines on the ventral surfaces of the front femora and other leg adornments. The first Yorkshire example was noted by Cheetham on 'sandhills' at Spurn on the occasion of the YNU visit on the August Bank Holiday in 1919. Since then it has been found in many, mostly lowland, locations across the County but with no clear habitat preference. Many sites are dry and specimens are most often found either on the ground or close to it, while the leg spines indicate a possible predatory life-style. However, the annual report of the YNU Entomological Section for 1957 contains an unusual note for this species: 'VC64 Temple Newsham, Leeds, swept in large numbers from bracken 16/6/57 H.M.R.' [=H.M.Russell], (*The Naturalist*, 1958, p.18).

Schoenophilus

Schoenophilus versutus (Hal. in Walker) is one of the tiniest dolichopodids, measuring barely 2mm. and, as a dull-grey fly, it can easily be overlooked in the sweep-net. To some extent this may account for its apparent scarcity in Yorkshire, and also the current Nationally Scarce status. It was first recorded in the County by Cheetham at Gristhorpe Bay (VC62) in 1948; it was next reported, in 1956 and subsequently, from Malham (VC64) in the Tarn area and also at Great Close Mire and Ha Mire. More recently it has been found at Fen Bog (VC62) in July 2013 and 2014.

Thinophilus

Two species occur in Britain:- *T. flavipalpis* (Zett.) and *T. ruficornis* (Hal.), but neither has been reported from Yorkshire. The inclusion of 'Yorks.' in the distribution notes for *T. flavipalpis* in Fonseca (*op. cit.*) is erroneous and, as in the case of *Aphrosylus raptor* noted below, this may have arisen due to a misinterpretation of entries on the Cheetham cards (Crossley, 2014b).

Both *Thinophilus* species are restricted to salt-marshes and they are distributed widely along the southern coast of England and as far north as Morecambe Bay on the west coast. However, neither are known on the east coast further north than Norfolk (Drake, 2017).

Other non-Yorkshire species

In addition to *Thinophilus*, four more British hydrophorines are not yet recorded from Yorkshire: *Aphrosylus mitis* Verr., *A. raptor* Hal. in Walker, *Hydrophorus rufibarbis* Gerst. and *H. viridis* (Mg.).

A. mitis is a tiny fly, about the size of *A. ferox*, and is currently awarded Nationally Scarce status. A coastal species, it is patchily distributed from Cornwall to Essex and with one site in South Wales (Drake, 2017). *A. raptor* is another Nationally Scarce fly with a mainly south-west distribution; the inclusion of 'Yorks.' in the distribution notes in Fonseca (*ibid*.) is, as noted above, an error.

H. rufibarbis, another Nationally Scarce species, is widely distributed throughout much of the Scottish Highlands where it occurs at altitudes ranging from 400-1020m (Falk & Crossley, 2005). *H. viridis* is Nationally Rare, with no records further north than Norfolk; sites include seepages on soft coastal cliffs (Drake, 2018).

Note 1. The foregoing accounts are based entirely on the records of the Yorkshire Naturalists' Union, including my personal records. For many years I have been aware that the YNU is not the sole custodian of biological data relating to the County. More recently several, apparently competing, national and regional electronic recording schemes have been established and there may, therefore, be Yorkshire records of significance of which I am unaware.

Note 2. It has recently been shown that *Orthoceratium sabulosum* is the correct name for this species, which has hitherto been known, in error, as *O. lacustre* (Pollet & Stark, 2018).

Acknowledgements

I am obliged to Dr C.M. Drake for helpful discussions and for drawing to my attention the recent paper by Pollet & Stark referred to in Note 2. As always a great debt of gratitude is due to those past and present dipterists who have contributed their records over the years. Paul Cayton kindly photographed specimens from my collection which illustrate this paper.

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Shooting for Victory: Trends in game bag data at Brodsworth Estate during the First World War

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The Brodsworth Estate (SE505070) is situated on the Magnesian Limestone ridge five miles north west of Doncaster, South Yorkshire and includes parts of the adjacent districts of Adwick le Street (SE5408), Bilham (SE4806), Hampole (SE5010) and Marr (SE5105). During its ownership by the Thellusson family, the rural holdings of the estate were managed by a staff of keepers in a series of 14 shooting beats. The esteem of a shooting estate was judged by the numbers and variety of the game 'bagged', the enjoyment of the terrain and companionship/rivalry of the participants. Shoots were highly organised affairs; akin to military operations, indeed high ranking military officers frequently attended as guests. The Brodsworth Estate shooting parties were significant social events for family members, their guests and neighbouring landowners (see Table 1). Participants signed in to the game book, the name of the beat to be worked was recorded and the numbers of each species of game bird or mammals were meticulously totalled.

Table 1: A sample of guests who took part in the Brodsworth estate shoots during the first two decades of the 20th century.

Barbury, H.J.	Grant-Dalton, Captain C.	Stanley
Brundell, H.	Grant-Dalton, Captain D.	Taylor, Howard
Brundell, P.	Humble, W.	Thellusson, Augustus
Charlesworth, C.	Mellor, J.S.	Thellusson, Charles
Collier, W.F.	Neville, Major N.	Thellusson, Percy
Copley, General	Nugent	Thornton, Captain
Dymond, J.	Palmer, Major	Warde Aldam, W.
Ellison	Pilkington, Sir Thomas	Whitelaw
Farmer, Rev. E.	Richardson	Wilson
Fowke, Sir Frank Bt.	Simpson, E.J.	Wyville, D'arcey

The Brodsworth Game Books form a valuable research resource (see Howes, 2010 & 2017) and I was fortunate to have access to them during the 1980s through the kind offices of the late Mrs Sylvia Grant-Dalton and her daughter Mrs Pamela Williams. Currently the documents which cover the period from 1862 to 1959 are preserved, catalogued and available for study in the Doncaster MBC Archives (Ref. DD/BROD/5/1-13). A further two game books, under the curation of English Heritage, are still retained in the library at Brodsworth Hall and associated estate accounts showing income from game are in the Brotherton Library, Leeds University (ref. YAS DD168) (Caroline Carr-Whitworth pers. comm.).

During the 1st World War enemy U-Boat activity and the hostile mining of UK coastal seaways, limited the activity of the UK fishing industry and reduced importation of foodstuffs. This rapidly resulted in major shortages as market forces responded to resource availability. Table 2, based on market prices published in the *Doncaster Chronicle,* shows how local game prices escalated during the war years.

Table 2: Escalating game prices at Doncaster Market.

	1914	1918
Pheasant	3/6 (17.5 pence)	13/6 (67.5 pence)
Partridge	2/- (10 pence)	Not available
Hare	2/- (10 pence)	11/- (55 pence)
Rabbit	1/- (5 pence)	2/6 (12.5 pence)

English Heritage has documentary accounts of Brodsworth's game being sold to local game dealers, and being taken on a game cart (still in the Brodsworth Hall collection) to Doncaster railway station to be sent to Leadenhall game/poultry market in London. During the war, game was also given away to friends, family and local connections, such gifts being recorded in a recipe book at Brodsworth - which happens to be a re-used game book (Caroline Carr-Whitworth pers. comm.).

As the war progressed, certain food shortages were exacerbated by hoarding and in urban areas queueing for limited supplies became a daily necessity, leading in extreme cases to civil unrest. By 1917 carbohydrate foodstuffs were subject to rationing and by 1918 meat supplies were included in the scheme. The contentious matter of the allocation of supplies was adjudicated over by local committees, the *Doncaster Chronicle* reporting on the progress of vigorous lobbying for increased quotas of meat for coal miners and other categories of manual labourer.

Home-grown food resources, including the produce from country house shooting estates, therefore became important for public supply. In order to examine the exploitation of game species during the period of the Great War 1914-1918, a comparison of shooting effort and the numbers of game harvested prior to, during and after the war years was made over the period 1910 to 1922 (see Figures 1 & 4).

Figure 1: A relative rise in the annual numbers of shoots during the war years 1914-1918 coincides with a decline in the annual numbers of the four main game species.

Pheasants declined from a pre-war mean of 136 per shoot and descended to a nadir of 19 per shoot in 1918. Partridges peaked at over 76 per shoot in 1915 but thereafter fell to below 25 per shoot (see Figure 2).

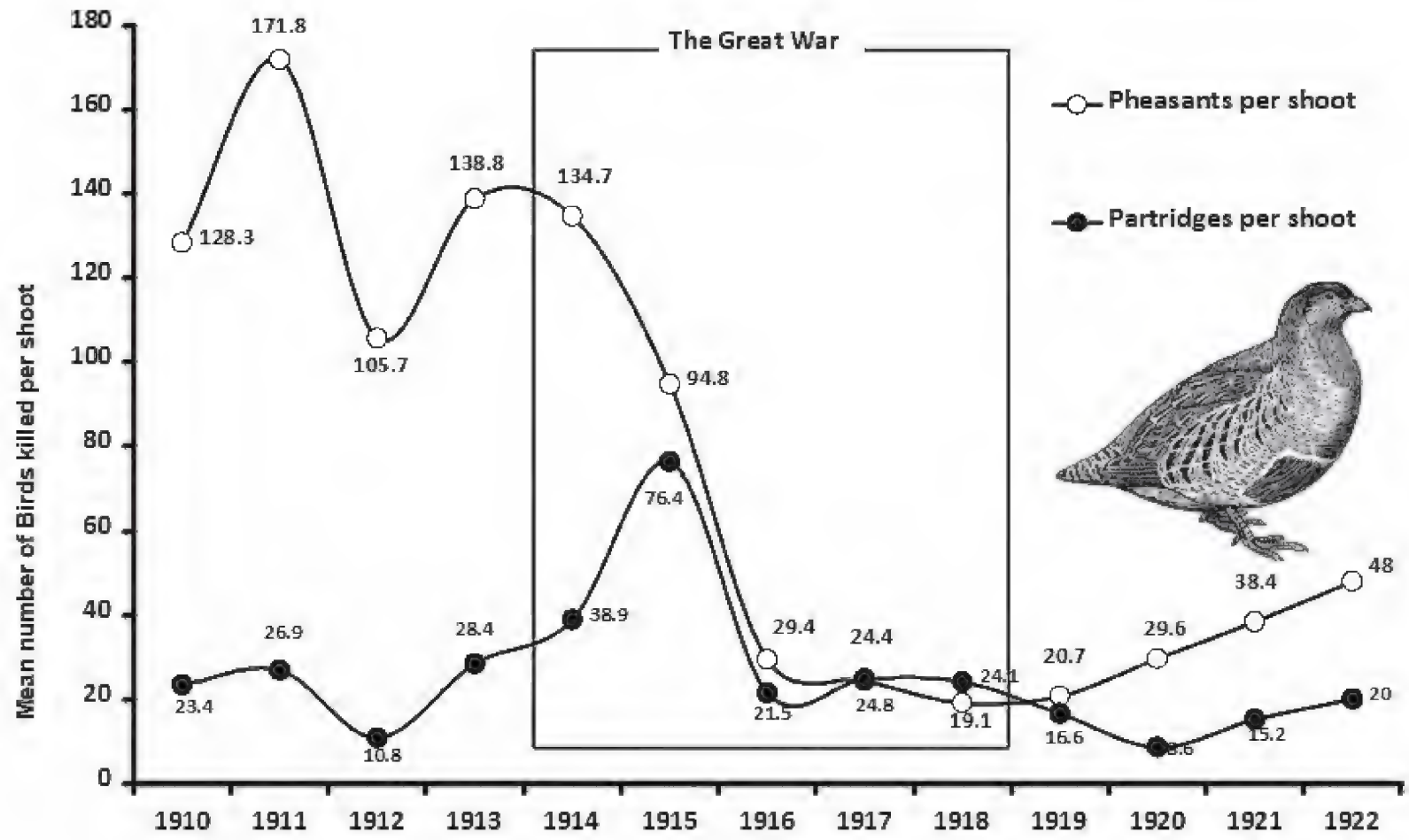

Figure 2: Trends in the mean numbers of Pheasants and Partridges bagged per shoot before, during and after the Great War.

To generate more game for the market and for domestic needs, the frequency of shoots increased from about 30 per shooting season pre-war to a mean of 40 (maximum of 43) per shooting season during the period of the war. This effectively increased the effort put into harvesting game and whereas it briefly increased the availability of Pheasants *Phasianus colchicus*, Grey Partridges *Perdix perdix*, Brown Hares *Lepus europaeus* and Rabbits *Oryctolagus cuniculus* for human consumption, a subsequent steep decline showed that this strategy was not sustainable (see Figure 1).

Rabbits, usually thought to be present in inexhaustible supply, fell from a pre-war mean of 24 per shoot to 12 per shoot in 1914, briefly rising to just over 17 per shoot in 1915 but dropping to a nadir of 4.7 per shoot in 1918. Brown Hares at Brodsworth peaked at just over 37 per shoot in 1915 falling to 13 per shoot in 1918 (see Figure 3).

Figure 4 shows the numbers and total of the main game species shot or trapped annually during the war years.

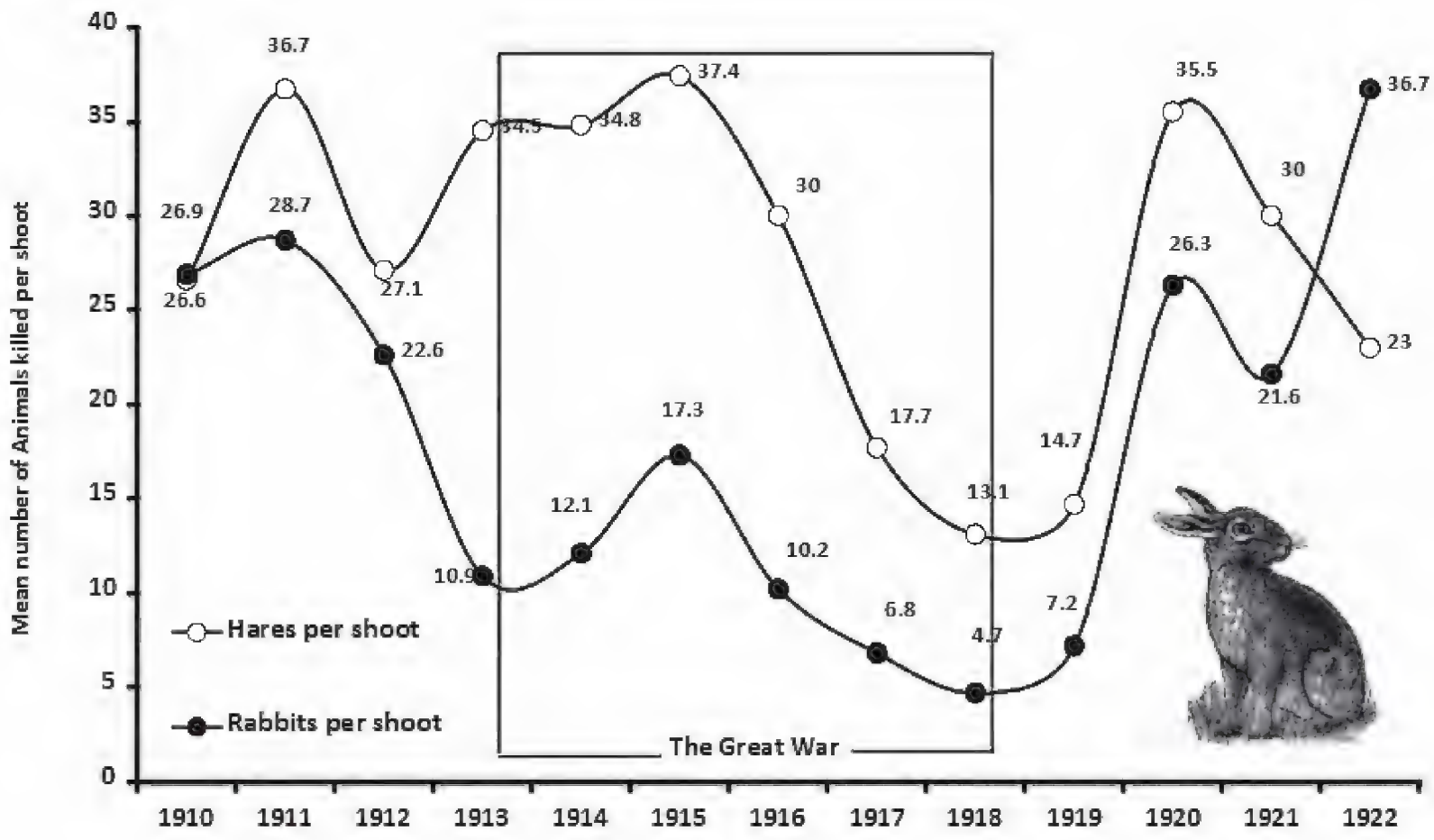

Figure 3: Trends in the mean numbers of Brown Hare and Rabbit bagged per shoot before, during and after the Great War.

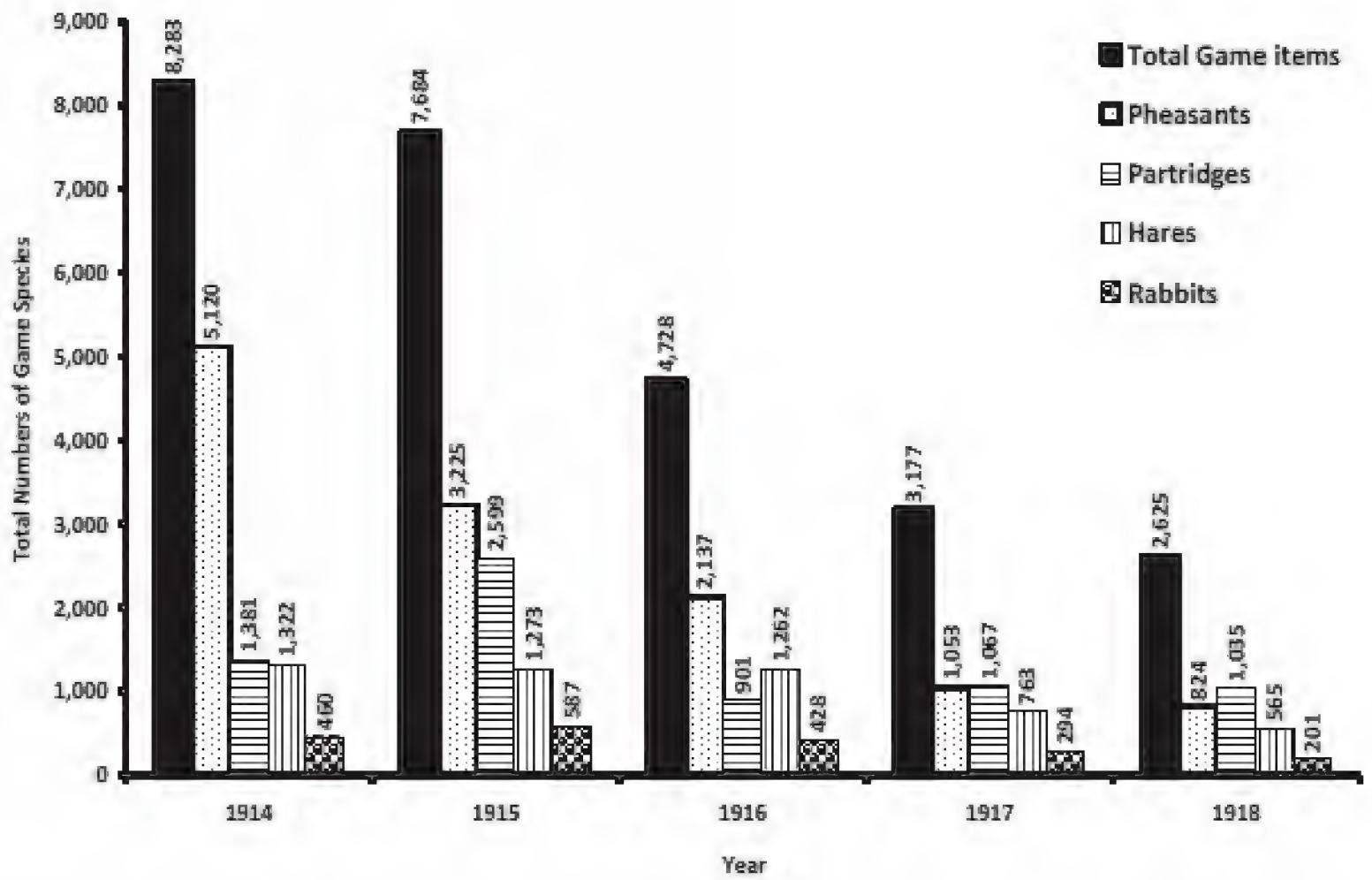

Figure 4. The numbers and totals of Pheasant, Partridge, Brown Hare and Rabbit shot or trapped annually during the war years 1914-1918.

In order to allow Brodsworth game bag data to be compared with figures from other estates or with regional or national means and trends, Table 3, generated from totals in Figure 4, expresses records in terms of specimens bagged per 100 hectares.

Table 3: Estimations of game density per 100ha on Brodsworth Estate in 1914 and 1918

	1914		1918	
	Total shot	Approx. cull per 100ha.	Total shot	Approx. cull per 100ha.
Pheasant	5120	158	824	25
Partridge	1381	43	1035	32
Hare	1322	41	565	17
Rabbit	460	14	201	6
Total	8233	256	2625	80

Discussion and conclusions

With so many men away on active service, not only were large shooting parties no longer possible (e.g. 31 guns had been present on one occasion in 1901), game management involving rearing and replenishing new stock, controlling predators and the policing of poachers, evidently became untenable.

Sharrock (1976), using Game Conservancy data, estimated that 65% to 75% of pheasants in the national game bag were derived from self-sustaining feral populations, the rest (25% to 35%) made up from commercial pheasant rearing. He therefore concluded that decreases noted in the National Game Bag figures during the 1914-18 and 1939-45 wars were likely to be due to temporary reductions in pheasant rearing. At Brodsworth, however, the cull of 158 pheasants per 100ha in 1914 dropping to 25 per 100ha in 1918 represented a decline of over 35%, therefore suggesting that the core feral population was being eroded by unsustainable levels of exploitation.

Tapper (1999), using data from archives at the Game Conservancy, showed that the mean annual numbers of rabbits killed per 100ha ranged from 45 to 52 from 1910 to 1914, dropping to below 30 from 1916 to 1918. On the Brodsworth Estate (see Table 3) the rate of rabbit kills collapsed from 14 per 100ha in 1914 to 6 in 1918. The Brodsworth rabbit population was far below national mean levels and the decline was steeper, possibly indicating a particularly high level of local poaching.

With regard to Brown Hare, Tapper & Parsons (1984), again using Game Conservancy data, showed that for other shooting estates across Yorkshire and the north-eastern counties, the cull represented a mean of 10 per 100ha in 1915, dropping to 5 per 100ha in 1917. Curiously the Brodsworth populations were proportionally higher than the regional mean with 41 shot per 100ha in 1914, dropping to 17 per 100ha in 1918.

With reference to the Pheasant in the wider countryside, Mather (1986) noted that it was "at one time thought to be entirely dependent on man for its food and requiring re-introductions ... many thousands are reared and released annually". Chislett (1952) felt that "cessation of artificial feeding and rearing would reduce pheasants to very small numbers" but found that

"except in more thickly populated parts of the country it holds its own". With the expanding coal industry in South and West Yorkshire in the early 20th century, the Brodsworth Estate had become sandwiched between a number of densely populated colliery villages. It is likely that unchecked poaching pressure from these communities would have affected Brodsworth's game populations, particularly in times of food privation.

The Brodsworth Estate archives record that the entire game keeping staff was dismissed in 1913, a rationale for this being the possibility of collusion with local poachers (Caroline Carr-Whitworth pers. comm.). Interestingly, supportive evidence for this draconian action is a sudden decline in the harvest of all game species in 1912 and a catastrophic drop in rabbit numbers in 1913 (see Figs. 2 and 3). Further, several of the replacement keepers, including the new head keeper William Colledge, left for active service in the Great War (Caroline Carr-Whitworth pers. comm.).

The Brodsworth Estate game, notably pheasant and rabbit, is shown to have been in steep decline during the period of the Great War (see Figs. 2 & 3), probably due to over-exploitation, exacerbated by insufficient game management/re-stocking, with an overall harvested game density reducing from 256 per 100ha in 1914 to 80 per 100ha in 1918 (see Table 3). It is likely that local extinctions of game species would have occurred had the war persisted for many more shooting seasons. However, it is worthy of note that while populations persisted the estate contributed a total of 26,497 items of game to domestic food resources during the war years 1914-1918 (see Fig. 4 and Table 3).

Acknowledgements

I am grateful to the late Mrs Sylvia Grant-Dalton and her daughter Mrs Pamela Williams for initial access to the Brodsworth Game Books. The staff of Doncaster MBC Archives and Local Studies Library provided further access to the documents and to microfilm of the *Doncaster Chronicle.* Particular thanks are due to Caroline Carr-Whitworth, English Heritage Curator of Brodsworth Hall, for valuable comments derived from her research for the 2007 exhibition on the shooting estate.

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A summary of Odonata records in the Spurn Bird Observatory area: analysing the evidence for breeding and migration

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Introduction

The Spurn recording area, the land between the southernmost tip of the Spurn peninsula to the north side of the Easington Gas Terminal, is one of the most comprehensively recorded areas for wildlife in Britain. The Yorkshire Naturalists' Union (YNU), the Yorkshire Wildlife Trust (YWT) and the Spurn Bird Observatory (SBO) have ensured that a broad spectrum of fauna and flora has been recorded, with individual records stretching back to the 1800s. In the early years, Odonata were largely overlooked but, as biological documenting has developed, specifically the work of the SBO who began systematically recording Odonata in 1996, it is now possible to collate and summarise the history and abundance of these insects at Spurn.

The key landmark of the Spurn area is the three mile long peninsula that stretches into the Humber estuary. North of the peninsula the coastline opens out into fields and waterways, with the area stretching northwards past the village of Kilnsea up to the village of Easington. Key sites for Odonata are

- Clubley's Scrape: three shallow ponds situated on the cliff top a kilometre north of the peninsula;
- the Canal Zone: a well vegetated ditch which borders the Humber estuary north of the Peninsula;
- the Church Field: an area of land managed by the SBO with a number of small ponds.

Other waterways and ponds are monitored across the Spurn recording area but their value for Odonata varies. A more detailed account of locations where Odonata can be seen in the Spurn recording area is due to be published in *Skimmer*, the annual magazine of the Yorkshire Dragonfly Group (Branch in press.*)*; a map of these locations is available on the SBO website. (https://www.spurnbirdobservatory.co.uk/find-us/)

The aim of this paper is to summarise records of Odonata in the Spurn recording area. Most records refer to the adult (imago) insect. The source for the majority of the data is the SBO log, a daily summary of all sightings in the area from visiting observers, and patterns of abundance and change have been observed. These data are supplemented by other sources, in particular the annual reports of migrant and dispersive dragonflies in Britain for the years 1996 to 2017 (the most recent report being Parr, 2018), the YNU Odonata database, the YNU entomological surveys of Spurn undertaken 1947 – 1953 (Butler and Popham, 1954; Hincks, 1951; Hincks and Shaw, 1954) and reports in *Skimmer*.

Analysing the data allows interpretation of flight periods and abundance for adult Odonata at Spurn. This is summarised for each species as: the earliest date an adult has been recorded at Spurn, the latest date an adult has been recorded at Spurn, and the maximum adult count in a single day, either by single or multiple observers.

Evidence of breeding is based on reports of any of the following: mating, ovipositing, larvae, exuviae and apparent recent emergence of tenerals. Evidence of probable breeding is provided by persistence of a colony for at least two consecutive years. Defining what is meant by migration in Odonata is a difficult area (Adrian Parr pers. comm.). At Spurn there is often uncertainty as to whether an individual dragonfly originated from the local breeding population or had flown in from outside the area (and if so from where). For the purpose of this paper a distinction is made between a potential migrant (when it is considered that an individual may have flown from continental Europe and beyond) and a potential dispersive individual when it may have originated from a local UK population). This distinction is an attempt to reflect a difference between localised and long-distance movement.

Species accounts

1. Banded Demoiselle *Calopteryx splendens*

Earliest: 15 June 2003. **Latest:** 24 August 2007. **Max. count:** 4; 24 August 2007.

The Banded Demoiselle is the only member of the Calopterygidae (Demoiselles) to have been seen at Spurn. It is rare at Spurn, with less than 20 records. Since the first record in 2003 it has been observed almost biennially, but many records have been fleeting. All records have been of singles except in 2007, when there were five records involving a total of 10 individuals. A large number of sightings originate from around the Canal Zone, where the open areas of water are suitable for the insects to hunt whilst also providing vegetation on which to perch.

Insect migration as a whole is poorly recorded at Spurn, but the 2010 record clearly coincided with a large movement of butterflies and Common Pollen Beetle *Meligethes aeneus* arriving in off the sea, at a time when a high pressure system was situated over northern Germany. It seems likely that this Banded Demoiselle was of continental origin.

2. Common Emerald Damselfly *Lestes sponsa*

Earliest: 15 June 2014. **Latest:** 14 September 2014. **Max. count:** 40; 25 July 2013.

The YNU surveys of 1947-1953 found this damselfly to be quite common along the Canal Zone, suggesting that it had been present for some years. In July 1953 larvae were found, indicating breeding. There were then only three records between 1975 and 2000. Adult Emerald Damselflies can be highly mobile in order to survive in seasonally dry habitats, and it seems likely that these individuals originated from other Humber colonies.

In 2012, a colony was found on Clubley's Scrape and has continued to thrive, although there has been a decrease in observations, most notably in 2017. This decline could have been a result of observer effort or due to the scrapes being inundated by sea water on a near annual basis. In 2016 it was found that Emerald Damselfly had also colonised the Church Field ponds, and that it was thriving there, with mating and ovipositing noted during 2018. The immediate concern for this colony is that the ponds are becoming overgrown by New Zealand Pygmyweed *Crassula helmsii*, as it is not yet clear whether this will dramatically impact on the ponds' ecosystem. More recently, single individuals have been noted from other water bodies across the Spurn area, suggesting dispersal from the core Spurn colonies.

3. Scarce Emerald Damselfly *Lestes dryas*

This damselfly was once widespread across the fens of south-east England but now is restricted to small populations in East Anglia. YNU surveys in 1947-1950 found it to be quite common

along the Canal Zone together with the Emerald Damselfly (Hincks, 1951). The Scarce Emerald Damselfly was not found after the flooding with sea water in 1953 (Butler and Popham, 1954) and has not been seen in the Spurn area since. It is also worth noting that, even when it was widespread across south-east England, Spurn may have been an outlying, peripheral colony.

4. Large Red Damselfly *Pyrrhosoma nymphula*

Earliest: 26 May 2018. **Latest:** June 1950. **Max. count:** N/A

Given how common and widespread this damselfly is across Britain, it would seem to follow that the Large Red Damselfly would be abundant at Spurn. However, this is not the case and it is one of the rarest of the damselflies recorded in the Spurn area, with only a single recent record (in May 2018 by D. Lyness). This does however tie in with the lack of records of this insect in the area east of Hull (Ashton, 2013), although it is present across the Humber in Lincolnshire. These data suggest that it does not widely disperse away from existing colonies. There are, however, a few earlier records from Spurn: in 1949 and 1950 as well as in 1953, when larvae were found in Long Bank Ditch, providing evidence of breeding.

5. Blue-tailed Damselfly *Ischnura elegans*

Earliest: 2 May 1999. **Latest:** 17 September 2006. **Max. count:** 1000+; 20 May 1999

This is the most abundant Odonata species at Spurn. Even counts of 1000 (recorded between 1999 and 2003) can be an underestimate of the true numbers present. It colonises every water body, from the ditches at Long Bank to the shallow ponds of Clubley's Scrape.

The first records of Blue-tailed Damselfly were during the period 1947-1953, when it was found to be plentiful in all water bodies; numerous larvae were also recorded. It is notable that after the 1953 storms at Spurn, Blue-tailed Damselflies were egg-laying in quite saline waters, with larvae being found in ponds with an extremely high salinity, even up to 73% of seawater (Butler and Popham, 1954).

Clearly, this insect was well established by the time recording began. The fact that it was found to still be extremely abundant when recording was properly introduced in 1996 is a clear indication that the lack of records in between was a result of a lack of observation.

Since then, Blue-tailed Damselfly has continued to thrive at Spurn. New ponds and ditches have always been quickly colonised and there has been no indication of any decline. Among the records there are notably poorer years when fewer individuals are recorded, but this is usually as a result of either adverse weather or poor recording effort. Recent evidence of breeding includes mating and ovipositing, with larvae and exuviae, at several locations in July 2018 (Gómez and Shillaker, 2019 and pers. comm.). Because this damselfly is so abundant already, it is difficult to know what percentage (if any) are migrants or dispersive individuals. Teneral individuals have been seen emerging at Spurn before flying off high, but where they go and for what purpose has yet to be understood.

6. Common Blue Damselfly *Enallagma cyathigerum*

Earliest: 3 May 1999. **Latest:** 28 September 2001. **Max. count:** 700; 19 May 1999

This is extremely abundant at Spurn. Huge numbers can be seen in May and June when emergence is at its peak. The only record from the 1947-1953 YNU surveys was in July 1952 from Long Bank Ditch. It was not reported again until noted around Clubley's Scrape during the second half of July 1996, which coincides with the establishment of regular recording and it is

likely that the species was present in the intervening years. Every year since 1996 this damselfly has been found to be abundant, with colonies in almost every water body in the Spurn area.

The abundance of Common Blue Damselfly in the Spurn area makes it difficult to identify individuals that have emerged locally and those which are migrants or are dispersing. There is one interesting record from 1999 when over 100 were seen roosting in the field around Clubley's Scrape. As the morning warmed it was noted that they all took to the air, flew high and then headed south. This is the only record of this type of behaviour seen on such a scale at Spurn, but individual insects have been seen displaying similar behaviour. Many of these were tenerals, but it is unclear how far these individuals will travel. Mating was recorded in July 2018 (Gómez and Shillaker pers. comm.)

7. Small Red-eyed Damselfly *Erythromma viridulum*

Earliest: 21 July 2018. **Latest:** 3 September 2011. **Max. count:** 20+; 1 & 3 August 2009

Given the range expansion of this damselfly in Britain since its first colonisation in 1999, it was predicted that it would one day colonise Spurn. In 2007 the first individuals were seen on Canal Scrape and later in an adjoining area known as the Triangle. That year there were many records including ovipositing individuals.

In the years following, with the exception of 2009, there were just a handful of records. This may be down to observer coverage, as the source of the remaining records was a small area of Canal Scrape behind a reed bed, where viewing was extremely restricted. The insect seemed to remain loyal to this area, making casual observations difficult. Adverse weather conditions also played a part in the limited records, with ideal conditions often lacking during the flight season.

After 2013, the colony appeared to collapse. There are two schools of thought for why this occurred: one is the level of reed bed encroachment in the area where Small Red-eyed Damselfly seemed to have settled, the other is inundation by salt water. On 4 and 5 December 2013 the Spurn area was inundated by a storm surge. Many of the freshwater areas across Spurn were affected, and the groundwater level was raised substantially. If the colony was already struggling, as seems to have been the case given the lack of records, it may be that a storm surge could have finished it off.

Due to the species continued range expansion across Britain in the years following the apparent collapse of the Spurn colony, it was thought that it might one day reappear and potentially recolonise. On 21 July 2018 a single female was photographed on Clubley's Scrape during a period of extended warm weather. Just 10 days later around 20 individuals were seen around the Canal Zone/Canal Scrape area, and individuals continued to be seen around the Canal Zone during the early part of August, with ovipositing frequently noted. In addition to the Canal Zone reports, at least six individuals were noted on the pond behind Westmere Farm, at the north end of Kilnsea, on 5 August, including one pair ovipositing. The last recorded date was 14 August.

It is noteworthy that the related Red-eyed Damselfly *Erythromma najas,* which has been present in south-east Yorkshire for longer than the Small Red-eyed Damselfly, has not yet been recorded in the Spurn area.

8. Azure Damselfly *Coenagrion puella*

Earliest: 6 May 2004. **Latest:** 10 August 2018. **Max. count:** 50; 18 June 2017

The only records prior to 1996 come from YNU surveys when larvae were found in Pallas's Pond and adults in Long Bank Ditch during 1952. There were no more sightings until 2003, when large numbers appeared in the Triangle. The reason for this sudden appearance could be as a result of them being overlooked but this seems unlikely as regular Odonata recording had been ongoing for several years. Therefore there had probably been dispersal from nearby or more distant colonies. The latter possibility is supported by the presence of an individual at the Point (the southern tip of the peninsula) in 2003.

The following year good numbers were seen again, although fewer insect/days were recorded. Only a handful of observations were recorded over the next ten years, most of which seem to refer to migrant individuals. It is unclear if the large numbers seen in 2003 were able to become properly established, but the fact that these numbers lasted only two years suggests not.

Then, in 2015 the Azure Damselfly was recorded often during July. Ovipositing has been seen regularly in Church Field pond and around the Canal Zone, suggesting that it had once again become established. Hopefully this second apparent colonisation will be more successful than the previous one.

9. Hairy Dragonfly *Brachytron pratense*

Earliest: 27 May 2017. **Latest:** 24 June 2017. **Max. count:** N/A

With the recent range expansion of this dragonfly in the Humber area it was an expected addition to the Spurn recording area. There were a number of probable sightings before an individual was confirmed in 2017, with two additional records subsequently. All the Spurn records probably refer to dispersing individuals from nearby colonies, but none of these individuals seem to have stayed for long. A number of colonies can now be found in the wider Humber area, so it is expected that records at Spurn will increase, with the potential for future colonisation.

10. Southern Migrant Hawker *Aeshna affinis*

This is primarily a Mediterranean insect which is known to breed at a small number of sites in south-east England. During 2018 there was a nationwide influx of this dragonfly, coinciding with a period of extremely hot, dry weather. During this period the first records for Yorkshire were observed, first at Flamborough on 23 July followed by a mature male at Spurn on 25 July (D. Foster, G. Gordon). (See Fig.1 p24). The individual remained at Spurn until 27 July, frequenting an area at the north end of the Canal Zone.

11. Southern Hawker *Aeshna cyanea*

Earliest: 29 July 2014. **Latest:** 8 October 2015. **Max. count:** 2; 25 August 2016

This has only been recorded at Spurn 17 times since the first sighting in 1952. The majority (11) of these records have occurred since 2000, and it is now recorded almost biennially. The Southern Hawker has been recorded breeding at Spurn once - during the autumn of 2018 an ovipositing female was observed at a garden pond in Easington. All of the records refer to migrant or dispersing individuals, either from other nearby colonies or the near continent.

12. Brown Hawker *Aeshna grandis*

Earliest: 22 July 2003. **Latest:** 13 August 1995. **Max. count:** 2; 1 August 2018

This is widespread and common across England but there have only been 12 confirmed Spurn records since the first in 1995. These usually refer to individuals seen briefly, giving the impression of migrating or dispersing through the area. Colonies are known to exist along the Humber, but with the current national trend for Brown Hawker remaining largely stable and its association with wooded habitats, it is unlikely that there will be any major future increase in records.

13. Migrant Hawker *Aeshna mixta*

Earliest: 17 July 2005. **Latest:** 11 November 2015. **Max. count:** 150; 3 September 2018

This is an extremely abundant anisopteran dragonfly at Spurn, second only to Common Darter. Autumnal easterly winds can produce large counts often exceeding 100 individuals. During these weather conditions local individuals are presumably supplemented by continental migrants. This theory is supported by the large numbers of observations along the peninsula, where no permanent water bodies exist to support a breeding population.

The first confirmed record at Spurn was on 30 September 1980, when one was caught at the Warren, at the northern end of the peninsula. Subsequent recording was patchy until 1996; many *Aeshna* species that were seen were not identified but most would have likely referred to Migrant Hawker, given its subsequent abundance.

Once regular recording of dragonflies was established, records of this insect increased dramatically, mirroring its national dispersal and increase. The 2001 Spurn Wildlife report describes it as breeding during that year (no further details were provided). Because large numbers of adults are seen through the autumn months it has been assumed that breeding occurs annually at Spurn. Unfortunately there is only limited evidence of breeding behaviour; tenerals have been observed during the summer in recent years. Hence breeding at Spurn may not be as frequent as it initially appeared; the large numbers of adults seen may be mostly a consequence of local dispersion or migration from the continent.

The first adult sighting of the year is usually during late July or early August, with the flight season ending during late October, occasionally lasting into early November. Sheltered areas in particular provide opportunities for individuals to hunt, especially the taller trees around Kilnsea and the thick vegetation found at the Point of the peninsula.

14. Norfolk Hawker *Anaciaeshna isoceles*

In Britain the range of this dragonfly is mostly restricted to the fens of East Anglia, but in recent years there has been some limited range expansion in south-east England; it is more widespread on the continent. There is a single Yorkshire record at Spurn, an adult male on 20 July 2003. The sighting occurred during a southerly wind system direct from the continent, fuelled by a low pressure system over Britain and a high pressure system over southern Europe. These conditions support the theory of a continental migrant origin for this individual. There are similar single observations away from the core British populations at other locations: Languard, Suffolk 1991; Titchfield Haven NNR, Hampshire 2007 amongst others.

Figure 1 (see p22). Adult male Southern Migrant Hawker *Aeshna affinis* seen at Spurn from 25-27 July 2018, the only record at Spurn. *D.J.Branch*

Figure 2 (see p26). Adult male Keeled Skimmer *Orthetrum coerulescens* seen at Spurn on 16 July 2013, the only record at Spurn. *T.D.Jones*

15.Emperor Dragonfly *Anax imperator*

Earliest: 1 June 2017. **Latest:** 22 September 2007. **Max. count:** 30; 1 September 2009

This is now well established at Spurn, the largest dragonfly recorded. Adults have a preference for open water bodies to hunt, with males being very territorial. Its ability to utilise almost any water body for breeding is one of the main reasons why this insect has been so successful

at Spurn. The Emperor Dragonfly was first confirmed at Spurn when one was seen along the peninsula on 16 August 1995. During subsequent years records increased dramatically. 1998 was the year with the highest number of observations (99 days). From 1998 onwards it has remained an established part of the Spurn Odonata community. Adults usually emerge during June with the flight season mostly ending during late August or early September. On average, Emperor Dragonfly is recorded on 40 - 60 days a year, with counts usually peaking at 10 -15 individuals. The sighting of one in 1996 coincided with the arrival of some Four-Spotted Chasers, which suggested a possible continental origin (Parr, 1997). Ovipositing and the presence of probable Emperor larvae were recorded in 2018 (Gómez and Shillaker pers. comm.) and exuviae are collected most years. There are also some reports of Emperors flying south at Spurn, suggesting dispersal of Spurn individuals to new areas.

16. Lesser Emperor *Anax parthenope*

Since the first British record in 1996 the status of this dragonfly in Britain has changed. Whilst still a nationally rare species which breeds primarily around the Mediterranean, it is recorded annually in Britain and has even been recorded breeding in Cornwall and Co. Durham. There is one Lesser Emperor record at Spurn, when an adult male was seen briefly on Clubley's Scrape during the morning of the 30 July 2000. It passed through quickly and was not seen after the initial sighting.

17. Vagrant Emperor *Anax ephippiger*

This originates primarily from sub-Saharan Africa and has a semi-nomadic lifestyle dictated by rainfall. Wandering migrants often make their way into Europe and more occasionally further north to Britain. Recent influxes (e.g. 2011, 2013) suggest it may be increasing in abundance. The only Spurn record refers to a female seen in Easington during the afternoon of 13 October 2018 (P. Saunders, J. Lowen). This was the fifth record for Yorkshire and was the prelude to a small influx along the south coast of England.

18. Downy Emerald *Cordulia aenea*

In Britain this has a widespread but scattered range, mainly centred around the south-east, but with other populations in Cumbria, Glamorgan and the west coast of Scotland. The Downy Emerald has a low dispersal rate and new colonisations tend to occur near existing sites. There is one Spurn record, a male seen along the Canal Zone on 22 July 2003 (J. Thompson). It occurred during a period of south-westerly winds from Europe, suggesting a migrant origin from the continent.

19. Four-spotted Chaser *Libellula quadrimaculata*

Earliest: 3 May 2005. **Latest:** 1 September 2000. **Max. count:** 30; 23 June 2010

This is a widespread dragonfly across the northern hemisphere and Britain. Nationally it is on the increase, especially around the Humber. Migrants are known to occur in Britain; occasionally large influxes can be composed of hundreds of insects. Migration events on this scale are not known from Spurn, but there is some evidence for small influxes from the continent; e.g. the arrival of 11 individuals on 21 June 1998 coincided with a period of lepidopteran immigration on the south and east coasts of Britain (Parr, 1999).

The first records of Four-spotted Chaser were during the period 1947-1953 from ponds located near the Warren, which have subsequently been lost to erosion. Larvae were found in Long Bank

Ditch. Between these surveys and the introduction of dragonfly recording in 1996 there were only four years with records (1985, 1986, 1992, 1994). All of these refer to single individuals with the exception being three which flew south past the Narrows on the peninsula on the 5 August 1994. It is probable the Four-spotted Chaser remained abundant during this period.

Records have increased since 1996 due to recording of Odonata by the SBO. Breeding has been confirmed, with ovipositing observed and exuviae collected (Gómez and Shillaker, 2019 and pers. comm.). The Four-spotted Chaser is always one of the first dragonflies to emerge at Spurn, usually during May, with a flight season that lingers until mid-August. It displays no habitat preference at Spurn and most water bodies support individuals holding territories.

20. Broad-bodied Chaser *Libellula depressa*

Earliest: 11 May 2011/2018. **Latest:** 3 August 2002/2008. **Max. count:** 4; 28 May 2015

Nationally, the range of the Broad-bodied Chaser is expanding rapidly. It was first recorded in south-east Yorkshire in the mid-1990s, becoming established after 2000. The national increase in records is reflected at Spurn. The first individual was recorded in 2000 but until 2011 the species was recorded less than annually with only 14 records.

From 2014 the Broad-bodied Chaser has been recorded every year. Ovipositing has been noted in both Church Field and in ponds in Easington. It is now a resident feature of the Spurn Odonata community and is an early coloniser of new ponds, so the provision of new water bodies at Spurn has undoubtedly contributed to its establishment. As ponds mature the Broad-bodied Chaser will often disappear, because extensive aquatic vegetation is less suitable for it. This is demonstrated by the number of records from the Church Field, once the hotspot location for this insect at Spurn, but now restricted to a handful of single sightings since 2017, probably as a result of the spread of the invasive New Zealand Pygmyweed in the ponds. In recent years an increase in the number of observers has resulted in a marked increase in records from Easington.

21. Black-tailed Skimmer *Orthetrum cancellatum*

Earliest: 16 May 2004. **Latest:** 12 September 2007. **Max. count:** 60; 25 June 2018

This has also undergone rapid range expansion across Britain. The YNU entomological surveys of 1947 - 1953 did not encounter it and there were no records until regular recording commenced in 1996. A single male recorded from Canal Scrape on 10 and 11 July was the first record for Spurn. No more were recorded until 15 July 1998 when another male was seen on Clubley's Scrape. From this point onwards the Black-tailed Skimmer has remained abundant at Spurn and is now one of the most common dragonflies. Ovipositing and mating have all been observed on numerous occasions, confirming the breeding of the Black-tailed Skimmer at Spurn.

Black-tailed Skimmer counts can suffer distortion due to only males holding territory and hunting at water bodies. It is now well-established at Spurn; double figure daily counts are extremely common. On average, sightings are recorded from between 30 - 50 days a year. Clubley's Scrape is the main stronghold because it provides bare pond margins where males can perch, a key habitat requirement for this insect.

22. Keeled Skimmer *Orthetrum coerulescens*

This has only been recorded once at Spurn, when an adult male was found in the Warren Heligoland trap on 16 July 2013 (T.D. Jones, J. Ashton-Booth) (See Fig. 2 p24). Nationally, Keeled

Skimmer is very range restricted due to its preference for peaty, acidic habitats. Many British colonies are isolated, with the bulk of the British range found along the south coast and in Wales. There are a handful of colonies in North Yorkshire as well as in Norfolk, but these are the closest colonies to Spurn. Dispersal of Keeled Skimmer has been documented, but wandering individuals are almost always found inland, very rarely at the coast, suggesting that they are dispersing from nearby populations. The Spurn record is an exception to this rule; being found on the coast suggests a possible migrant individual from the continent.

23. Ruddy Darter *Sympetrum sanguineum*

Earliest: 3 July 2018. **Latest:** 7 October 2002. **Max. count:** 32; 3 August 2013

This was first recorded at Spurn in 1951, when two records were submitted to the YNU. The following year YNU entomological surveys undertaken in July found it to be present in Long Bank Ditch. The next Spurn record was in 1997; singles were found at the Warren on 13 August, 2, 7 and 10 September, plus three along the peninsula on 8 September. The following year one to four were recorded on nine dates between 8 August and 6 September. With the exception of one, which was at the Point of the peninsula, all were noted at the south end of the Canal. No females were recorded.

Modern breeding was first inferred in 1999 when multiple observations were recorded between 23 July and 4 September. Most were single records, with a peak count of nine on 24 July. All records came from the south end of the Canal. Very few were seen in 2000, with just a handful of single figure counts over a period of 51 days. In subsequent years it has been considered that the Ruddy Darter was established at least at the south end of the Canal Zone, with a varying number of records each year. The fluctuations in the annual number can be attributed to observer coverage, similar to the Common Darter, and to the weather. The Ruddy Darter has also expanded its range at Spurn, with frequent sightings inferring colonies which are now recognised from Church Field and along Beacon Lane, amongst other locations. Positive breeding evidence at Spurn is scarce due to the low number of observations, although mating has been recorded in the Triangle in recent years.

24. Common Darter *Sympetrum striolatum*

Earliest: 7 June 2003. **Latest:** 15 November 2006. **Max. count:** 400; 22 July 2003, 29/30 August 2018

This is by far the most abundant anisopteran dragonfly at Spurn. YNU surveys 1947-1952 found it to be extremely common, with larvae recorded at several locations. The number of larvae was considerably reduced in 1953 after flooding by sea water (Butler and Popham, 1954). Common Darters were recorded annually after this, although in small numbers. Despite being one of the few dragonflies recorded between 1952 and 1996, it was not until 1997 that breeding was again confirmed when a fresh teneral was found by Clubley's Scrape. Over the next few days 350 emerged and dispersed, and ovipositing was seen. In 1998 several hundred emerged from 21 June onwards, with tenerals found from the same date onwards. The sheer scale of this breeding event alone suggests that breeding had been overlooked prior to 1997. Mating and ovipositing are both frequently observed, and exuviae have also been collected.

Autumn counts of Common Darter are supplemented by continental migrants, the largest counts always occurring after easterly winds from Europe and coinciding with large counts of Migrant Hawkers. Although the peak abundance fluctuates from year to year, many autumn totals are conservative and three figure counts are almost certainly an annual occurrence.

25. Vagrant Darter *Sympetrum vulgatum*

There is one record of this at Spurn when a male was caught in the Heligoland trap at the Point on 5 August 1995 (B.R. Spence). The record coincided with an extraordinary influx of migrant dragonflies from the continent, especially Yellow-winged Darter.

The Vagrant Darter occurs in Britain as an extremely rare vagrant, with only around 25 accepted records. The majority of these centre on the south-east, with only one other accepted record for Yorkshire. There is no pattern to observations in Britain, and as a result records are likely to remain sporadic in the future.

26. Red-veined Darter *Sympetrum fonscolombii*

Earliest: 7 May 2018. **Latest:** 12 October 2017. **Max. count:** 38; 20 June 2006

Until recently the British status of the Red-veined Darter was as a rare migrant from the continent. However, a number of colonies have developed along the south and east coasts in recent years and migrants are more abundant. Spurn is one of the best places in Britain to encounter the Red-veined Darter due to records occurring every spring and the small colony that developed as a consequence of regular migrant influxes.

The first record for Spurn was one caught on the saltmarsh in July 1952 (J.H. Flint) but a subsequent record did not materialise until 9 June 1996 when one was photographed at the Point of the peninsula by a group of day visitors. It has been recorded in nearly every year since, although in varying numbers. Breeding was first confirmed in 1996 when ovipositing was observed (Parr, 1998) and then in 1998 when exuviae and tenerals were found on 22 May. Mating and ovipositing have been observed in multiple years since. Spring tenerals are usually considered to be offspring of migrants from the previous year. Teneral observations during the autumn of 2006, 2014 and 2017 have been attributed to the offspring of those breeding earlier the same year. Parr (2015) notes that the output of tenerals in autumn seemed to be low, and that such a rapid life-cycle is normally associated with more southerly locations in Britain. In 2017 autumn emergence was also recorded in Goole (around 50 miles further west) (Hinks, 2017) as well as at Spurn. It was in 2017 that breeding was last confirmed at Spurn and it was an exceptional year for this insect. Clubley's Scrape is the source of most sightings and evidence of breeding; its proximity to the coast offers the first suitable habitat for continental migrants once they have made landfall. Recently, records have originated from other water bodies across the Spurn area, with an increase in single observations along the immediate coastline.

The annual changes in the number of observations are likely down to local weather affecting flying adults, as well as the larger spring weather systems which impact on the number of continental migrants making landfall at Spurn. The majority of British colonies have a lifespan of only a handful of years, but Spurn is one of the few sites where colonies have been known to endure for longer.

27. Yellow-winged Darter *Sympetrum flaveolum*

Earliest: 2 August 1995. **Latest:** 23 August 1997/1998. **Max. count:** 2; 7 August 1995/ 9 August 1998

There are no permanent colonies of Yellow-winged Darter in Britain – all records refer to continental migrants or breeding episodes following migrant invasions that cease after a few years. The first record at Spurn was in 1995, part of an invasion of the Yellow-winged Darter across Britain, with over 700 records nationally, fuelled by a high pressure system over

Scandinavia bringing easterly winds from as far east as Finland, Russia and the Baltic states. By the end of August the number of Spurn records had already reached eight. Although subsequent invasions were not of the same scale as 1995, multiple individuals were recorded during the summers of 1997 (c.75 records nationally), 1998 and 2006 (200+ records nationally). Each of these influxes was the product of an easterly wind system produced by a pressure system (1997, 1998 high pressure; 2006 low pressure) over the Baltic or Scandinavia. Currently 20 individual Yellow-winged Darters have been seen at Spurn, but all have occurred in the years 1995, '97, '98 and 2006.

28. Black Darter *Sympetrum danae*

Earliest: 4 August 1999. **Latest:** 28 October 2004. **Max. count:** 2; 27 September 2004

This has a preference for acidic, upland habitats and consequently occurs only as a rare visitor to Spurn, with just 15 records since the first in 1955. Nationally it is widespread in suitable habitat but is generally absent from the south-east of England. The nearest colonies to Spurn are on the Humberhead Peatlands about 50 miles west along the Humber, and some of the Spurn records likely refer to dispersing individuals from this colony. Records from along the south-east coast of England, substantial distances from any local colonies, imply that continental migrants can make landfall in Britain, although it is unclear if any of the Spurn records refer to continental migrants.

Conclusions

A total of 28 species of Odonata have been recorded in the Spurn area. The unique geography of Spurn, in combination with its wide variety of freshwater habitats, is undoubtedly the reason that such a variety of Odonata has been recorded. With a large number of rare and migrant dragonflies, it raises interesting questions about the movements of these insects. Under the right weather conditions, Spurn offers landfall for migrant Odonata. As species have expanded their range Spurn has seen a host of new colonists.

In recent years, 14 dragonflies and damselflies have been confirmed as breeding. In addition there is a historical record of breeding by the Large Red Damselfly and it is believed that the Scarce Emerald Damselfly probably bred in the past. The occurrence and breeding of Odonata in the Spurn area for the 7-year periods 1947-1953 (YNU survey data) and 2012-2018 are compared in Table 1 (p31). The species composition is quite similar for Zygoptera (Damselflies), the main differences being the loss of the Scarce Emerald Damselfly and colonisation by the Small Red-eyed Damselfly. The differences are greater for the Anisoptera (true Dragonflies). The most notable change is the establishment in more recent years of Emperor, Broad-bodied Chaser and Black-tailed Skimmer as breeding species, none of which were recorded in 1947-1953. This is in line with the first records of these dragonflies in south-east Yorkshire during the 1980s and 1990s (Ashton, 2013).

Odonata are mostly associated with freshwater and therefore periodic inundation of Spurn by seawater can have a negative effect on local populations. Scarce Emerald Damselflies, Small red-eyed Damselflies and Common Darters are thought to have suffered from sea water inundation. In contrast Blue-tailed Damselflies seem to be quite tolerant of some salinisation. A recent study of Blue-tailed Damselfies in Sweden has identified a gene considered to be associated with this species adapting to waters of different salinity (Dudaniec *et al.,* 2018).

The continued global temperature increase will likely be associated with additions to the current Spurn Odonata list. Resident British species continue to expand their range and new species pioneer new colonies, which in turn opens up further opportunities for migration and occurrence at Spurn. Feasible possibilities include: Willow Emerald Damselfly *Chalcolestes viridis*, a recent colonist currently expanding its range across eastern England (recorded well into Lincolnshire in 2018), Red-eyed Damselfly, which has now colonised North Yorkshire, or colonisation by the Large Red Damselfly, a widespread species in the UK. It is expected that the populations of Odonata at Spurn and across Britain are likely to undergo huge changes in the coming decades and, as a hotspot of insect migration, Spurn will continue to be an excellent place to appreciate these stunning invertebrates.

Acknowledgements

This report would not have been possible without the Odonata records submitted by many individuals to the Spurn Bird Observatory and especially by Barry Spence, former Spurn Warden. Records from other sources were also valuable, particularly those from the Yorkshire Naturalists' Union. I am especially grateful to Dick Shillaker for providing additional information and editorial input.

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Website

https://www.spurnbirdobservatory.co.uk/find-us/

Table 1. The occurrence and breeding of Odonata in the Spurn area for the 7-year periods 1947-1953 (YNU survey data) and 2012-2018.

Species *	**1947-1953**	**2012-2018**
Zygoptera (Damselflies)		
Banded Demoiselle		#
Emerald Damselfly	# B	# B
Scarce Emerald Damselfly	# PB	
Large Red Damselfly	# B	#
Blue-tailed Damselfly	# B	# B
Common Blue Damselfly	#	# B
Small Red-eyed Damselfly		# B
Azure Damselfly	# B	# B
Anisoptera (Dragonflies)		
Hairy Dragonfly		#
Southern Migrant Hawker		#
Southern Hawker	#	# B
Brown Hawker		#
Migrant Hawker		# B
Emperor		# B
Vagrant Emperor		#
Four-spotted Chaser	# B	# B
Broad-bodied Chaser		# B
Black-tailed Skimmer		# B
Keeled Skimmer		#
Ruddy Darter	#	# B
Common Darter	# B	# B
Red-veined Darter	#	# B
Black Darter		#
Number of Odonata species	**11 present** **6 breeding** **1 probably breeding**	**22 present** **14 breeding**

Key:

 # Present.

B Evidence of breeding: mating, oviposition, larvae, exuviae, tenerals apparently recently emerged.

PB Evidence of probable breeding: colony persists for at least two consecutive years.

** Five other species were recorded between 1954 and 2011 (Norfolk Hawker, Lesser Emperor, Downy Emerald, Vagrant Darter, Yellow-winged Darter) but there is no evidence for any of them breeding.*

A report on the use of DNA metabarcoding for entomological recording at Potteric Carr

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Introduction

Potteric Carr Nature Reserve is a large mixed site owned by Yorkshire Wildlife Trust, with large areas of wetland (dominated by reedbeds) but also with significant areas of woodland (wet woodland and mixed broadleaf) and grassland (pasture and meadow) with smaller areas of fen. The site is on the edge of Doncaster, between the M18 and the suburbs. Although it is best known for its bird interest, a long-running moth recording scheme (run by Ian Heppenstall since 1971) has shown the great potential of the site for invertebrates; 875 species of moth have been recorded.

However, the lack of further entomological expertise at Yorkshire Wildlife Trust (in local staff or volunteers) means that the invertebrate fauna of Potteric Carr is relatively unknown other than moths and beetles (Bob Marsh, the county Coleoptera recorder, is local to Potteric Carr). Increasing our knowledge of the species present was a key driver of this survey.

To further add to this a German study (Hallmann *et al.*, 2017), showing long term decline of invertebrates on nature reserves, inspired action. Their decline was shown using only a broad measure of biomass (weight of samples), so this seemed easy enough to replicate. But killing so many insects just to obtain their weight seemed a little excessive. Although the samples could be retained there was no realistic prospect of them being identified by Yorkshire Wildlife Trust staff or volunteers.

With these two considerations playing on my mind, investigations into DNA metabarcoding were undertaken to see if this was a viable way of analysing samples collected in a similar way to the German study. This has proven to be effective in delivering records in a way that is not a drain on already limited experts' time (Yu, *et al.,* 2012; Elbrecht *et al.*, 2017; Barsoum, *et al.,* 2018). This paper presents the initial results from a small trial (3 samples analysed using DNA metabarcoding) from 3 traps run in different habitat types on Potteric Carr during 2018.

Methods

Malaise traps (Fig.1) were run at three locations chosen for their differing habitats and ease of access but also remoteness from the public (to avoid vandalism):

1. Beeston Plantation – a Victorian mixed broadleaf plantation, taken into Yorkshire Wildlife Trust management in 2015 but prior to this had almost no management of the habitat for decades. Dominated by Sycamore *Acer pseudoplatanus* and Silver Birch *Betula pendula*, with few other trees and a relatively poor ground flora.
2. Loversall Carr Fields – ex-arable land converted to grassland in the winter of 2015/16; 2018 was the first year that part of the land was left for a hay crop, but the site has been grazed by cattle and sheep since spring 2016.

Figure 1. Malaise traps at the edge of Beeston Plantation. *J.Horsfall*

3. Huxterwell Marsh – ex-arable land converted to wetland (dominated by open water and reedbed) during 2003-6. The wetland is reaching a level of maturity and supports good numbers of wintering ducks and breeding predators such as Bittern *Botaurus stellaris* and Marsh Harrier *Circus aeruginosus*, suggesting that the food web is in a reasonable state.

Malaise traps were run for between 1 and 2 weeks, using alcohol as a killing and preserving liquid (although alcohol can make samples brittle this is not a problem for DNA extraction). Samples (Fig.2) were then weighed (sieving samples to remove liquid, until drops from sieve were 10 seconds apart) to give a measure of biomass collected. The samples were then sent (in this case to Nature Metrics) for DNA metabarcoding.

Figure 2. A Malaise trap sample.
J. Horsfall

Roughly speaking, the analysis consists of blending (homogenising) the sample, removing the body tissues (leaving just DNA), then dividing it into subsamples. Different chemical treatments (primers and amplifiers) are used with different subsamples to make certain key areas of the

DNA easy to read (the 'barcode'). Different treatments make the DNA of different groups of species more 'visible' or easy to detect (hence the need for subsamples treated differently). The barcodes from the different subsamples are all compared against libraries of reference DNA (e.g. BOLD - Barcode of Life Data system). An analysis of the degree of fit between samples and reference material is conducted. Those that reach a certain bar are considered matched. Lists of species can then be compiled for each sample. However, no measure of the abundance of the species is possible as a very large dragonfly would have the same amount of DNA extracted as hundreds of small flies. A comparison of the amount of DNA of each species is not currently very useful.

DNA metabarcoding is a well-developed method in some areas (e.g. large sample pots of invertebrates with no contamination, such as in this survey). However, in other areas (e.g. determining the invertebrates present in a water sample, a similar process to the eDNA technique used for Great Crested Newts *Triturus cristatus*, it is not yet possible to sift the wanted DNA from the contamination, although vertebrates seem to be reliably identifiable from this method (Tang, *et al.*, 2018). That said, there are still several problems with the method, perhaps greatest amongst them is that small amounts of DNA (e.g. from a single small fly in a large sample) can be drowned out in a sample with large numbers of a single species (e.g. large numbers of flies, or small number of larger insects). Furthermore the chemical treatment process is still developing and some species' DNA may not be amplified by the process (Elbrecht *et al.,* 2017). In this study we know that 26% of the species were not identified to species level. Therefore there may be more species unrecorded, and this number is unquantifiable.

Results

The report from the lab (Tang & Crampton-Platt, 2018) showed a total of 98 taxa identified. However, this total number includes different levels of identification. The vast majority were to species, some to genus and some only to family. At this coarse level the three samples had similar diversity - 33 taxa for Beeston Plantation, 40 for Loversall Carr Fields and 35 for Huxterwell Marsh. Most taxa were found in either one or two of the samples, with only 2 species being common to all three samples - Little Clusterfly *Pollenia griseotomentosa* and Streakless Greenbottle *Lucilia ampullacea*. This lack of overlap could be the result of differing habitats, differing timing of trapping or both.

Of the 98 taxa, 73 could be identified to species level (74%). For the remaining 26% either the sample was not good enough to identify them closely enough or there are not reference DNA barcodes available for those particular species.

The insects identified were dominated by flies (*Diptera*) with much smaller numbers of beetles (*Coleoptera*), caddisflies (*Trichoptera*), wasps (*Hymenoptera*), moths (*Lepidoptera*) and leafhoppers (*Hemiptera*). There were 34 families within these 6 orders represented. A full species list is not included here but can be obtained on request to the author. There were just two species with any kind of designation:

- a Drab Wood-soldierfly *Solva marginata* - a Nationally Notable species and a Red List species (on a pre-1994 list).
- a tachinid fly *Thecocarcelia acutangulata* - a Red List species (on a pre-1994 list).

Forty of the insects were new to Potteric Carr; again the vast majority were flies (39 species) with only a single new leafhopper, but this is to be expected given that the whole list was dominated by flies, whereas the moths, beetles, etc had all been recorded previously. Most of the insects new to Potteric Carr appear to be common, for example the Lesser Housefly *Fannia canicularis*, though others are less common, or perhaps even reflect range extensions (according to the NBN Atlas, although this does not have the most up to date records). A few examples of the less common flies are:

- *Chironomus commutatus*, a non-biting midge with only a single other UK record (Wicken Fen, Cambridgeshire)
- *Megaselia berndseni*, a scuttlefly with only two previous UK records (both at Flatford Mill, Suffolk)
- Three-striped Woodlouse-fly *Phyto melanocephala,* no other Yorkshire records.

Two species names provided by the analysis were of concern to the county recorders. *Lissonota errabunda* is listed as an ichneumon wasp but is not a valid species name (it is an old disused synonym for two species, so its real identity can not be ascertained). The cranefly *Nephrotoma scalaris* is a valid species, but not one previously recorded in the UK. It is relatively easy to identify, so if it exists here it would be expected that at least one record would have been submitted already.

The samples were weighed, with a measure of weight per day calculated as a way to compare given different lengths of trapping. However, this average does not take into account different weather conditions (rainy days being less likely to have much catch), nor does it take into account seasonal variation, as traps were run in different months of the year. The results are shown in Table 1.

Table 1. Weights of insect material caught by Malaise traps at different sites and different times of the year.

Location	**Month of trapping**	**Duration of trapping (days)**	**Total weight collected (g)**	**Weight per day (g/day)**
Beeston Plantation (western trap)	June	14	37.8	2.7
Beeston Plantation (eastern trap)	June	14	53.9	3.85
Loversall Carr Fields	July	10	23.7	2.37
Huxterwell Marsh	September	11	20.1	1.83

The second sample from Beeston plantation was done as a repeat (same dates of recording) and was not sent for DNA metabarcoding. It was hoped that it may be identified manually by experts to give a degree of checking on the DNA metabarcoding result. It has not yet been sorted and identified, so does not currently give us a way to verify the DNA analysis.

Discussion

Although some kinds of DNA metabarcoding are still in their infancy (for example, getting invertebrate records from environmental DNA in water is currently poor), this type of analysis is amongst the better and more reliable methods (Tang *et al.*, 2018). The report of this DNA

analysis (Tang and Crampton-Platt, 2018) showed that the sample was of high quality and the analysis had given results of a high degree of certainty. However, they are only as good as the reference library and at least two species are thought to have been misidentified. On the other hand, several of the other species listed are widespread (NBN, 2018), and Doncaster is a probable place to find them. Others were further north than the previous records on NBN (such as *Thecocarcelia acutangulata*, a fly that is thought to be moving north over time), but are still probable or possible finds in this area.

This highlights a major problem with this type of study - that although it takes most of the need for identification expertise out of the process, it still needs experienced entomologists to look at the records and make sense of them. And even then, as a degree of misidentification has clearly occurred, the records are not of as high a quality as those confirmed by voucher specimens submitted to a county recorder. However, some studies have shown the process to be more reliable than identification by a researcher and not sent to county recorders (Elbrecht *et al.*, 2017)

Another issue arises from those 25 taxa that were not identified to species level. However, the data are retained by the lab, so if the reference library is improved they can be reanalysed to try and identify the missing species. The raw data can be reanalysed against the BOLD database for free, but it may require the original lab technician to do this, which would incur further cost. Although this seems like a low rate of identification (25 out of 98 not fully identified) it is quite possible that many entomologists who use Malaise traps would disregard species from orders or families that are beyond their ability to identify (or outside their area of interest). A 100% identification rate is perhaps not a realistic target to set (although obviously we should aim for it if the reference library is improved). Also it seems that the species not identified are likely to all congregate in the less well-recorded groups (only one species of ichneumon wasp was reported where several would be expected, for example), so does not offer full coverage of species groups.

Perhaps the most important downside of this technique of analysing the samples is that it does not allow entomologists to further their knowledge by seeing associations between invertebrates and host plants (or similar links). Nor does it allow a new generation of entomologists to be trained up through morphological identification, or to inspire the public by allowing them to see the wide variety of life that is found in the UK, even in suburban Doncaster.

On the up side, this technique does allow a larger number of samples to be collected and identified (a single Malaise trap sample pot would take a considerable amount of time to identify). Even if the majority of the species identified are common it allows a better understanding of the fauna of a site, or the distribution of species from a larger number of records. Although DNA metabarcoding is not foolproof (it is only as good as the reference library, and requires samples to be taken in a fairly uniform way) it may reduce misidentification errors, particularly if a novice like me were to attempt to identify them.

It must also be noted that the method of trapping (Malaise trap) does seriously bias the species caught. Other traps are available that catch a wider variety of species (eg slam traps), or different trapping methods could be combined (eg pit fall and Malaise trapping). This initial trial was a proof of concept (that it would do what we wanted it to) and further methods

may be added at a later date. Many species are very hard to find at any life stage and so will require dedicated searching. This method will never produce a full site list (Fraser, Dytham and Mayhew, 2008) but produces a much wider list of species than one based on a narrow list of indicator species (eg butterfly transects or Breeding Bird Surveys). It could perhaps be the basis of a more reliable indicator, although it lacks information about the quantity of individuals, or breeding status.

After the cost of the initial purchase of the Malaise traps, ongoing costs of this technique would be for sample pots, alcohol and the cost of DNA metabarcoding (approx. £200 + VAT per sample). Yorkshire Wildlife Trust, being a charity, is unlikely to be able to afford multiple samples, limiting the extent of any future investigation.

Conclusions

This short study has shown that in some circumstances it could be a useful way to gather more records (around 40 new species records for Potteric Carr in this case). In this survey all the trapping sites used here were relatively recent additions to Potteric Carr (2003 to 2015) and had very few records of any sort, and those that were recorded were largely skewed to birds and flora (the interests of the staff or volunteers there), so although 40 species were new for Potteric Carr, most of the 71 positively identified species would have been new to the sub-sites.

Long term monitoring, even of biomass alone, could be of great use. Storing samples in alcohol means that the specimens could be preserved indefinitely. So even if DNA metabarcoding or manual identification could not be undertaken immediately there would be a record that could be consulted in future. This could be a useful dataset, particularly for seeing changes in species composition of sites over time e.g. due to habitat or climate change (e.g. Theissinger, *et al.*, 2018). Yorkshire Wildlife Trust intends to continue Malaise trapping at Potteric Carr and neighbouring nature reserves and limited use of DNA metabarcoding as budgets allow to further this end.

Acknowledgments

Thanks must be given to Alex Cromarty for help with field work, Phil Whelpdale and Doug Yu for help in developing the idea of this survey and potential for longer term monitoring. The knowledge of members of YNU including Roy Crossley, Bill Ely, Andy Godfrey, Andrew Grayson and Bob Croxton amongst others has helped to understand the veracity/usefulness of the results. And thanks to Nature Metrics for the laboratory work they undertook.

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The state of the Watsonian Yorkshire database for the aculeate Hymenoptera: Part 2 – the twentieth century to the 1960s

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Introduction

From the 1900s until the 1960s, 144 new aculeates (listed in the Appendix available on the YNU website at: https://www.ynu.org.uk/naturalist) were recorded in Watsonian Yorkshire compared with 131 during the 19th century (Archer, 2018). Figures 1 and 2 (p40) show the number of first records of species per decade and the number of first records of species of the Chrysidoidea, Vespoidea and Apoidea (wasps and bees) per decade, respectively. Figure 1 shows a decline in the recording of new species per decade. Figure 2 also shows this decline, particularly for the Apoidea-Bees, but not for the Chrysidoidea, which show an increase of first species recording during the 1930s and 1940s.

This paper will examine species recording during the first part of the twentieth century.

The recording of new species

The database shows that there were 30 recorders who reported new species and unknown recorders added two more. Most of them recorded fewer than ten species, often only one or two. The three foremost recorders were Rosse Butterfield, William Fordham and Douglas (W.D.) Hincks.

Fordham and Hincks were the foremost recorders of the Chrysidoidea. Hincks was mainly concerned with the Dryinidae and the Bethylidae and Fordham the Chrysididae. Hincks was able to use Richards (1939), which provided keys to the DEB (Dryinidae, Embolemidae,

Bethylidae) species. Hincks specimens were found at Manchester Museum and were examined and determined, if necessary, by W.A. Ely. Hincks was active during the 1930s, becoming the YNU Hymenoptera recorder from the 1940s until 1960. The increase in the recording of new specimens of the Chrysidoidea (Fig. 2) was due to the activity of Hincks. *Chrysis* specimens were found at the Scarborough Natural History Museum and identified by the Chrysid expert D. Morgan (Morgan, 1984). Another aculeate expert, G.M. Spooner, also provided determined records of new species including one, *Pseudomalus auratus,* found at Oxford University Museum (OUM).

Butterfield and Fordham were the foremost recorders of new Vespoidea. These two recorders benefited from Saunders (1896), which was the first book in English with keys to the British aculeates except for the DEB species. Butterfield was the main determiner, although he called upon the help of the national expert F.D. Morice in the determination of *Symmorphus bifasciatus*. The author determined three species, *Ancistrocerus trifasciatus*, *Evagetes crassicornis* and *Priocnemis parvula*, which were found at Manchester Museum. I also found *Symmorphus bifasciatus* at Manchester Museum determined by Morice (Morice, 1896).

Concerning the Apoidea-Wasps, Fordham and Hincks were again the foremost recorders of new species. Again the recorders had the benefit of Saunders (*op. cit.*). Spooner found *Pemphredon austriaca* at OUM determined by E. Valkella and was able to confirm this identification. *P. austriaca* has not been recorded again in Yorkshire. Saunders determined two species, *Passaloecus singularis* and *Psenulus pallipes*, for H.H. Corbett; Morice determined *Diodontus tristis* for Fordham and national expert I.H.H. Yarrow identified *Passaloecus insignis* for A.E. Bradley. I determined or confirmed ten species found at Cliffe Castle Museum, Keighley (2 species), Scarborough (1) and Manchester (7) Museums.

Concerning the Apoidea-Bees, Butterfield was the foremost recorder with 24 new species. Again the recorders had the benefit of Saunders (*op. cit.*). Butterfield was active during the 1910s, and was the YNU Recorder in the 1920s with Hincks taking over c.1935. Butterfield & Fordham (1930-1933) published their review of the Yorkshire aculeates in *The Naturalist*. The decline of new species recording during the first half of the century (Figs 1 & 2) was a consequence of both the cessation of Butterfield's recording activities and a reduction by Hincks, who had wide interests within the Hymenoptera.

Morice determined *Andrena denticulata* for Butterfield and R.C.L. Perkins determined *Andrena nigriceps*, *Lasioglossum punctatissimum* and *L. smeathmanellum* for Fordham. The author determined or confirmed nine species collected by Butterfield (including *Andrena falsifica*, *A. labiata* and *Lasioglossum cupromicans*), one species of A.E. Bradley and one species collected by J.F. Musham, all at Cliffe Castle Museum. The author confirmed *Lasioglossum laevigatum* (recorded by C. Devlin, determined by P. Skidmore) and *Melitta leporina* (recorded and determined by Skidmore) at Doncaster Museum & Art Gallery. I determined two species (*Andrena pilipes* and *Sphecodes miniatus*) collected by Hincks and one species collected by H.H. Corbett at Manchester Museum.

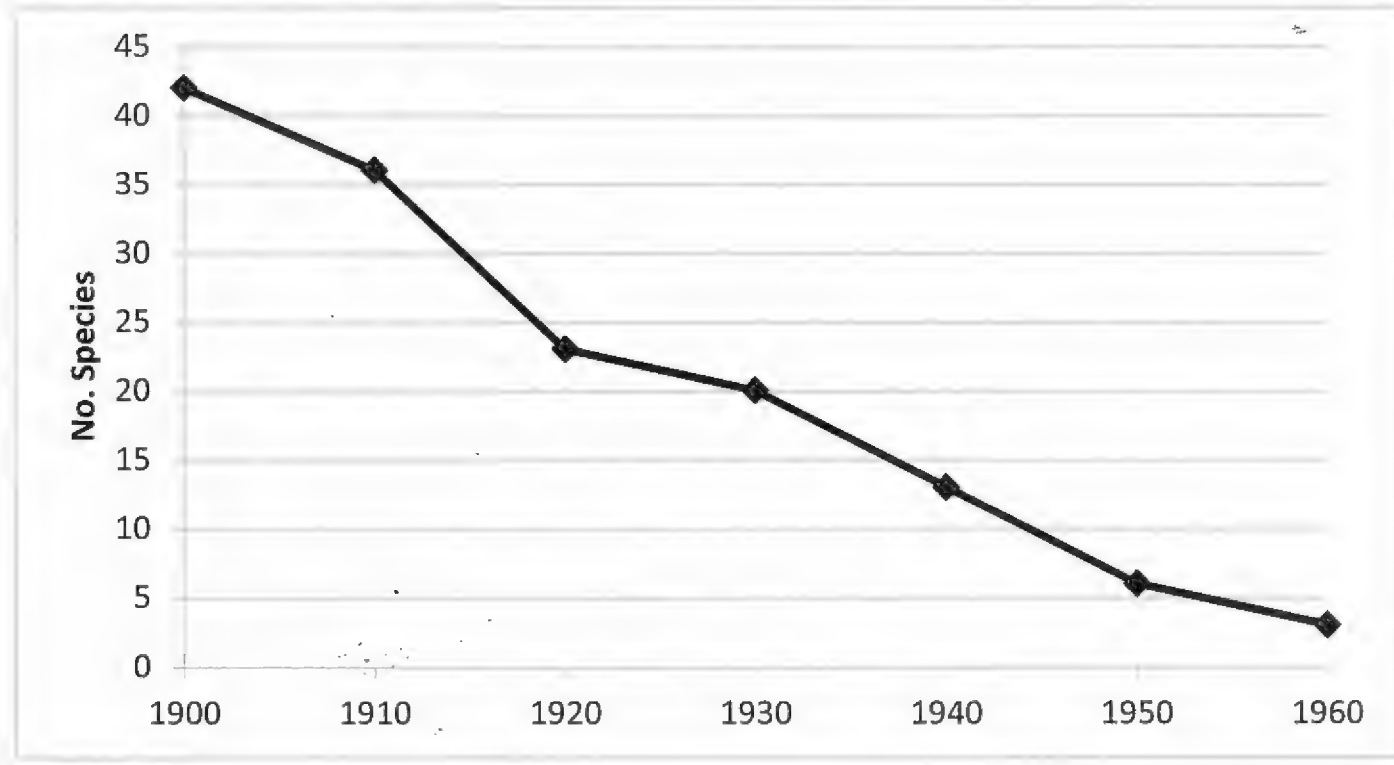

Figure 1. The number of first records of aculeate species per decade.

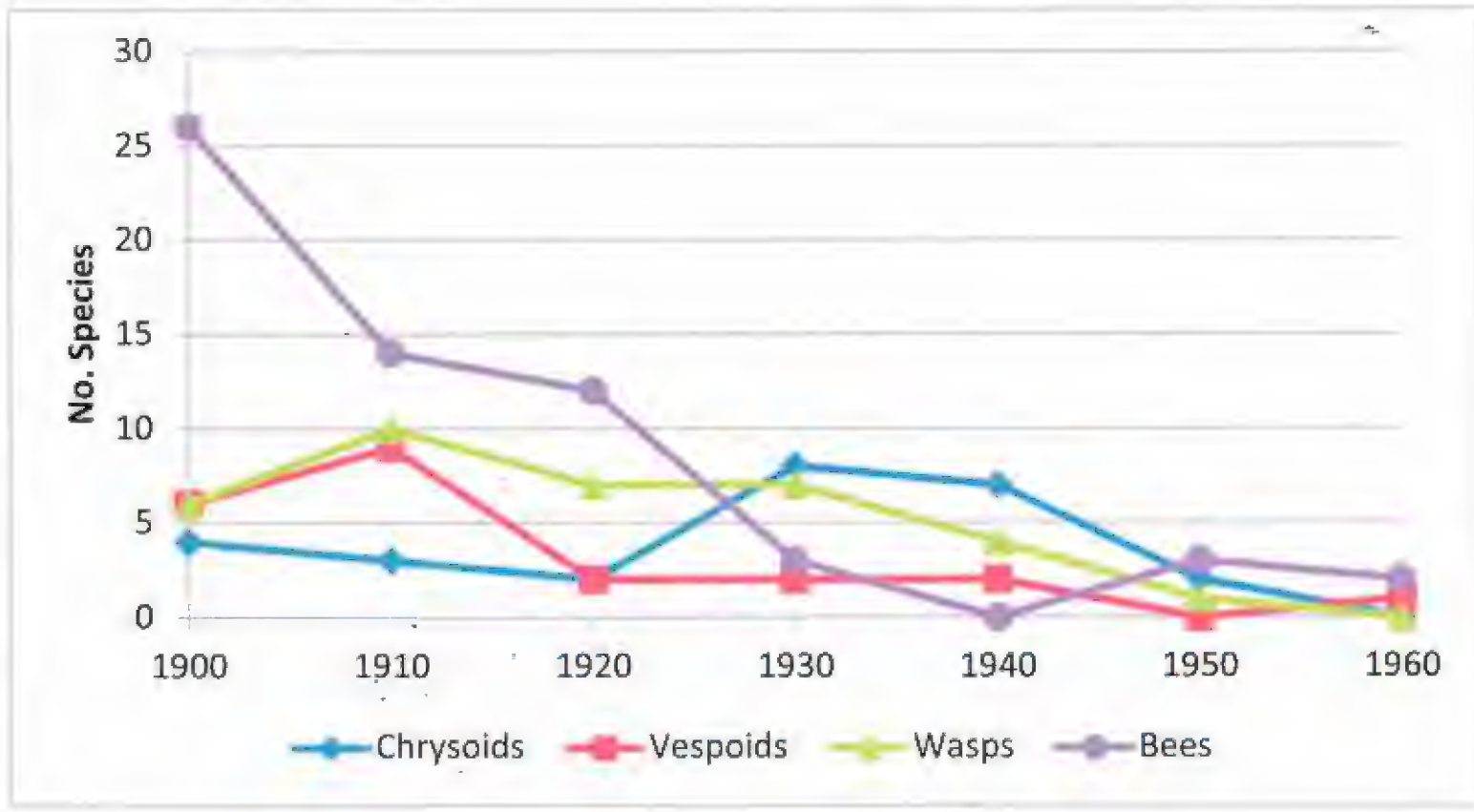

Figure 2. The number of first records of Chrysidoidea, Vespoidea and Apoidea (Wasps & Bees) per decade.

The review by Butterfield & Fordham (1930-33) can be treated as the major document of the early twentieth century. The rest of this paper is mainly concerned with an examination of this document.

Name changes

Name changes can be due to application of the appropriate priority code of The International Commission on Zoological Nomenclature (ICZN), or by misidentification. Table 1 shows some examples where the priority code has resulted in a change of specific or generic name or both, and misidentification. There have been many changes but reference to Else *et al.* (2016) is a guide to understanding the changes. Reference to Else *et al.* (*op. cit.*) shows an error in Archer (2018), which assumed from Butterfield and Fordham (1930 p. 369) that *Psammochares gibbus* was equivalent to *Arachnospila anceps* and that *P. unguicuaris* was equivalent to *A. trivialis*. Else *et al.* (*op. cit.*) shows that *P. gibbus* was a misidentification for *A. trivialis* and *P. unguicaris* was a synonym of *A. anceps*. Thus *Arachnospila anceps* (Archer 2018, Appendix) should be *A. trivialis* and *A. anceps* can be treated in this paper.

Table 1. Some examples of Name Changes due to Priority Code application and Misidentifications.

Priority Code		**Priority Code**	
Species change from	**to**	**Genus change from**	**to**
Myrmosa melanocephala	*Myrmosa atra*	*Notozus panzeri*	*Elampus panzeri*
Methocha ichneuonides	*Methocha artculata*	*Sapyga clavicornis*	*Monosapyga cavicornis*
Myrmica laevinodis	*Myrmica rubra*	*Donisthorpea nigra*	*Lasius niger*
Ancistrocerus pictus	*Ancistrocerus oviventris*	*Hoplomerus spinipes*	*Odynerus spinipes*
Crossocerus anxius	*Crossocerus ovalis*	*Blepharipus capitosus*	*Crossocerus capiosus*
Andrena gwynana	*Andrena bicolor*	*Halictus albipes*	*Lasioglossum albipes*
Nomada bifida	*Nomada ruficornis*	*Psithyrus vestalis*	*Bombus vestalis*
Priority Code		**Misidentifications**	
Species & Genus change from	**To**	**From**	**to**
Psammochares approrimatus	*Anoplius concinnus*	*Priocnemis fuscus*	*Anoplius viaticus*
Clytochrysus chrysostomus	*Ectemius lapidarius*	*Tachysphex pectinipes*	*Tachysphex pompiliformis*
Cuphopterus serripes	*Crossocerus dimidiatus*	*Blepharipus leucostomus*	*Crossocerus megacephalus*
Halictus freygessneri	*Lasioglossum fratellum*	*Andrena albicans*	*Andrena hae*

Species splits

Yarrow (1954) provided a key, distribution notes and maps of the closely related *Formica fusca* and *F. lemani*. *F. lemani* is a northern ant and the main species to be found in Yorkshire. *F. fusca* is a southern ant but has been found in Yorkshire. Records of *F. fusca* were recognised from 1954 onwards with specimens before 1954 recognised as *F. lemani s.l.* However, J.H. Flint's records of *F. lemani* from the 1960s can be accepted.

Priocnemis pusillus was separated into four species (*P. pusillus* s.s., *P. gracilis*, *P. schioedtei* and *P. cordivalvata*) (Haupt, 1927). Butterfield and Fordham (1930 p. 368) only recorded *P. pusillus,* which could be one of four species. *P. gracilis* was recorded from 1936 and *P. cordivalvata* from 1997. *P. pusillus* s.s. has not been confirmed as being recorded in Yorkshire and *P. schioedtei* is a common spider-hunting wasp in Yorkshire with the earliest confirmed specimens from 1919 from ones in the Natural History Museum, London. Specimens of *P. schioedtei* recorded from 1924 were found by the author in the Cliffe Castle Museum, so probably the records of Butterfield and Fordham are *P. schioedtei*.

The record of *Ancistrocerus trimarginatus* of Smith (1852) could be either *A. scoticus* or *A. trifasciatus*. Smith (1851) considered both these species and associated *A. trimarginatus* with *A. scoticus*. Roebuck (1907) and Butterfield and Fordham (*op. cit.*) recognised both species and their *A. trimarginatus* can be considered as *A. scoticus*.

Ancistrocerus gazella has been separated from *A. parietum* with the distinction between the two being given by Yarrow (*op. cit.*). The earliest Yorkshire specimen of *A. parietum* was found at the OUM dated 1897 and identified by Spooner, and the earliest specimen of *S. gazella* dated 1941 in the collection of J.C. Felton.

The species split of the mining bee *Andrena pilipes* into *A. pilipes* s.s. and *A .nigrospina* Thomson was considered by Barker (1994), who provided keys that separated the males but not the females. Only three specimens of this species-pair are known from Yorkshire, collected from Spurn Point and now in the Manchester Museum. Fortunately, two of the three specimens are males and could be identified as *A. pilipes* s.s. by the author.

Perkins (1935) found that *Lasioglossum smeathmanellum* consisted of two species, *L. smeathmanellum* s.s. and *L. cupromicans.* Specimens of *L. cupromicans* from 1907 were found at Cliffe Castle Museum and *L. smeathmanellum* s.s. from 1934 at Manchester Museum. A literature record from 1929 of *L. smeathmanellum* s.s. was subsequently identified by Perkins.

Other species splits to *Lasius niger*, *Priocnemis femoralis*, *Ancistrocerus parietinus* and *Trypoxylon figulus* were considered by Archer (2018).

Difficult groups

Anoplius viaticus and *Priocnemis perturbator* are two spider-hunting wasps which are active early in the year from April so that their identification could be confused. The females are readily distinguished from each other by gastral colouration. Smith (1852) recorded *Pompilus fuscus* and gave a description (Smith, 1858) that corresponds with *Anoplius viaticus.* Roebuck (1907) quotes Smith's records as *Pompilus viaticus*. Saunders (*op. cit.*) gives a description of *Pompilus viaticus* (*fuscus*) which corresponds with *Anoplius viaticus* but unfortunately gives a further description of *Priocnemis fuscus* which corresponds to *Priocnemis perturbator.* Else *et al.* (*op. cit.*) showed that *P. fuscus* was a misidentification for *P. perturbator.* Butterfield and Fordham (1930 p. 368) record two species - *Priocnemis fuscus* (presumably *Priocnemis perturbator*, at Levisham during 1924) and *Psammochares* (*Pompilus*) *viaticus*. Otherwise, the earliest confirmed records of *Priocnemis perturbator* were found at Manchester Museum (Askham Bog, Hincks 1942) and York Museum (Haxby and Sand Hutton, T.H. Elliott 1943).

Other difficult groups relating to *Formica rufa*, *Chrysis ignita* and *Sphecodes* were considered by Archer (2018).

Rejected species

Records for 28 species can be rejected.

Hedychridium roseum was recorded by Smith (1852) near Wakefield. This ruby-tailed wasp has never been recorded again and its host in England is probably *Astata boops*, which also has never been recorded in Yorkshire. This record is probable a misidentification for *H. ardens*. Shaw (1953) recorded it from Spurn Peninsula but later (Hincks & Shaw, 1954) recognised its misidentification and changed it to *H. ardens*.

Hedychrum niemelai was recorded as *H. lucidula* from Rufforth Wood about 1835 (Roebuck, 1907). Butterfield and Fordham (1930 p. 363) reported *H. nobile,* which could be a misidentification for *H. niemelai* (Else *et al., op. cit.*), and said confirmation was needed for this ruby-tailed cuckoo wasp. Perkins in Fordham (1933) rejected this record and Morgan (*op. cit.*) did not extend its distribution to Yorkshire. Its host is a species of *Cerceris* which was not found in Yorkshire until 1991.

Chrysis analis was recorded by Roebuck (1877) from Yarm. It is not a British ruby-tailed wasp.

Formica rufibarbis was recorded by Roebuck (1907) from Greenfield and by Butterfield & Fordham (*op. cit.*) from Hebden Bridge (1908) and Crinsworth Dene (1907). Collingwood and Hughes (1987) did not record this ant In Yorkshire and Skinner and Allen (1996) showed that it does not extend as far north as Yorkshire.

Anoplius infuscatus as *Psammochares chalybeatus* was recorded by Butterfield & Fordham (1930 p. 368) at Bessacar by reference to Corbett (1919), which does not record this spider-hunting wasp. It was eventually recorded from Blaxton Common during 2000.

Arachnospila consobrina as *Psammochares consobrinus* was recorded by Butterfield and Fordham (1930 p. 368) from Allerthorpe Common during 1927. From the Fordham cards Perkins wrote that this female specimen should be seen by a specialist. From the Fordham cards, Fordham could not find the specimen. This spider-hunting wasp has not since been recorded in Yorkshire.

Evagetes pectinipes as *Psammochares pectinipes* was recorded by Butterfield & Fordham (1930 p. 369) at several sites. *E. pectinipes* is only found in south-eastern England. These records are probably misidentifications for *E. crassicornis*.

Crabro scutellatus was recorded by Butterfield (Butterfield & Fordham, 1931 p. 156) from Allerthorpe Common during 1928. No further specimen has been recorded in Yorkshire and this solitary wasp has a southern English distribution.

Colletes marginatus was recorded by Smith (1855), probably near Wakefield. Perkins in Fordham (*op. cit.*) showed that Smith wrongly identified this bee. No further specimens have been found in Yorkshire.

C. similis as *C. picistigma* was recorded by Butterfield at Allerthorpe Common during 1927. Specimens so identified at Cliffe Castle Museum were found to be misidentifications for *C. succinctus*. No further specimens of this bee have been found in Yorkshire.

Hylaeus dilatatus as *H. annularis* is a Smith ms species, i.e. one that was only suggested by Smith as probably to be found in Yorkshire (Archer, 2002). No specimens have been found in Yorkshire.

H. pictipes Recorded as *Prosopis varipes* (Smith, 1855) probably near Wakefield. Perkins in Fordham (*op. cit.*) wrote that Smith was unreliable with species of *Hylaeus* and his type specimens of *varipes* consisted of two entirely different species.

Andrena apicata was recorded by Roebuck (1907) from Leeds. This bee has a southern English distribution and has not further been recorded in Yorkshire. It is easily confused with *A. praecox* (Scopoli) and *A. varians*, which have been recorded in Yorkshire.

A. flavipes was recorded by Fordham on Allerthorpe Common during 1928 (Butterfield & Fordham, 1932 p. 257) but has not been recorded again in Yorkshire. It has a southern English distribution.

A. fulvago was recorded by Smith (1855) near Wakefield (Butterfield and Fordham (1932 p. 280), at Allerthorpe Common and Kilnsea. Specimens with this determination were found at Cliffe Castle Museum and were misidentified as *H. rubicundus.* It has a southern English distribution.

A. nitida was recorded by Butterfield at Keighley during 1914. A specimen found at Cliffe Castle Museum with this name was found to be a misidentification for *A. scotica.*

A. ovatula was reported by Butterfield and Fordham (1932 p.281) but only as a Smith ms species.

A. rosae and ***A. trimmerana*** were recorded by Butterfield & Fordham (1932 p.259) at several localities. These bees only have a southern English distribution. The records are probably misidentifications for *A. scotica.*

A. tibialis was based on a doubtful record (Butterfield and Fordham, 1932 p.257) by Smith and is a Smith ms species.

Lasioglossum laevigatum as *Halictus lavvigiatus* is a Smith ms species, although there is a single confirmed record during 1966.

Coelioxys concoidea (as *C. vectis*) was recorded by Smith (1855), probably near Wakefield. No further specimens have been reported and its host (*Megachile maritima*) has not been recorded in Yorkshire.

C. mandibularis was reported by Roebuck (1907) for Smith and regarded as a doubtful record in Butterfield and Fordham (1932 p.311). Perkins in Fordham (*op. cit.*) showed this record was a misidentification.

Osmia aurulenta reported by Roebuck (1877) as a Smith ms species. No further specimen has been reported from Yorkshire. In northern England it is found on the west coast.

Nomada ferruginata as *N. xanthostricta* was reported by Smith (1851) near Yarm by Rudd and by Smith (1855) near Wakefield. Perkins in Fordham (*op. cit.*) showed that Smith's *N. xanthostricta* was *N. obtusifrons*. There are three nineteenth century records and a 1918 record by Butterfield (Butterfield & Fordham, 1932 p.281) of *N. obtusifrons* for Yorkshire but then this cuckoo bee was not recorded in Yorkshire until 1993.

N. flavopicta, reported by Butterfield & Fordham (1932 p.282), is a Smith ms species. It was first recorded in Yorkshire during 1972.

N. fulvicornis as *N. lineola* was reported by Butterfield & Fordham (1932 p.282) as a Smith ms species. It was first recorded in Yorkshire during 1971.

Anthophora quadrimaculata was reported by Roebuck (1907). No further specimens have been found in Yorkshire and it has a southern English distribution.

A. retusa was recorded by Smith (1852) near Wakefield and by Roebuck (1907) at Pannal. Perkins in Fordham (*op. cit.*) thought these records were unlikely. No further specimens have been found in Yorkshire and it has a southern English distribution. Probably it was a misidentification for *A. plumipes*.

Biographical notes

Rosse Butterfield was encouraged by his father to take an interest in nature study. He started work in the wool trade and became curator of the Bronte Museum at Haworth before becoming, in 1910, the curator of Cliffe Castle Museum, Keighley. Here he developed the collections and promoted the study of natural history. As County Recorder of the YNU he wrote the annual Hymenoptera report from the 1910s until his death during 1938. He collected mainly in the area around Keighley.

William John Fordham was encouraged by his family to enjoy nature study. He studied medicine at University College of Sheffield. He accepted a practice at Bubwith and took a Diploma in Public Heath, becoming the Tuberculosis Officer for Sheffield and Gateshead. He suffered an attack of *Encephalities Lethargica* and took early retirement to Barmby during 1928. He was interested in many orders of insects, particularly Hymenoptera, and compiled comprehensive card indices of British, mainly Yorkshire, insects, except for Lepidoptera. He collected in the area around Barmby Moor including Allerthorpe Common.

Walter Douglas Hincks was encouraged to take an interest in natural history by his teacher when at Leeds Boys' Modern School. He qualified at Leeds College in Pharmacy. During his spare time he studied many groups of insects, particularly the Hymenoptera Parasitica with a special interest in the Mymaridae (Fairy Flies). He became Curator of Entomology at Manchester Museum during 1947. He recorded in many parts of Yorkshire and wrote the Hymenopteran Report for the YNU mainly from the 1940s until 1960. He organised the Union's Entomological Section recording activities at Spurn Peninsula and Malham Tarn and, with S. Shaw (1953), wrote the aculeate Hymenoptera report for Spurn Peninsula.

More detailed information about Butterfield, Fordham and Hincks are given in Archer (2011).

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Notable records of leaf-mining moths in East Yorkshire, 2017 and 2018

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The historical scarcity of leaf-mining moth records in East Yorkshire (VC61) (see Sutton & Beaumont, 1989) is gradually being addressed by an increase in recorder effort (e.g. Nunn, 2015, 2017; Nunn & Warrington, 2016). This article documents the most notable records from 2017 and 2018. The species codes in the systematic list follow Agassiz *et al*. (2013).

Nepticulidae

4.006 *Stigmella sakhalinella*. The second VC61 record occurred on 23.x.2018 when Charles Fletcher (CHF), Ian Marshall (IM) and I found mines in Himalayan Birch *Betula jacquemontii* leaves near Sledmere. The first record was from North Cliffe Wood in 2014 (Beaumont *et al*., 2015).

4.009 *Stigmella alnetella*. The second VC61 record occurred on 31.x.2018 when I found tenanted mines in Common Alder *Alnus glutinosa* leaves in North Cliffe Wood. The first record was from Howsham in 2016 (Beaumont *et al*., 2017). The status of this species in Yorkshire is unclear owing to confusion with *Stigmella glutinosae* in the past, but it is likely more common and widespread than records suggest (Nunn, 2017).

4.014 *Stigmella catharticella*. The second and third VC61 records occurred on 28.ix.2017 and 27.x.2017 respectively when I found mines in Purging Buckthorn *Rhamnus cathartica* leaves at North Cave Wetlands and near Walkington. The first record was from North Cave Wetlands in 2015 (Beaumont *et al*., 2016).

4.022 *Stigmella regiella*. The first VC61 record occurred on 20.x.2017 when I found a mine (Fig. 1, p48) in a Common Hawthorn *Crataegus monogyna* leaf in Walkington (Beaumont *et al*., 2018) and the second occurred on 23.x.2018 when CHF, IM and I found mines near Sledmere. The first Yorkshire (VCs 61–65) record was from VC62 in 1868 (Box, 2019).

4.040 *Stigmella assimilella*. The second VC61 record occurred on 14.ix.2017 when I found mines in Aspen *Populus tremula* leaves in Hull. The first record was from Allerthorpe Common in 2013 (Frost, 2014).

4.058 *Stigmella basiguttella*. The fifth VC61 record occurred on 09.xi.2017 when I found mines in Pedunculate Oak *Quercus robur* leaves at Allerthorpe Common and the sixth, seventh, eighth and ninth were from Houghton Moor (03.ix.2018), North Cliffe Wood (31.x.2018), Cottingham (10.xi.2018) and Beverley Westwood (13.xi.2018). The previous records were from Allerthorpe Common in 2013 (Frost, *op. cit.*), Scampston Hall in 2015 and North Cliffe Wood in 2016.

4.061 *Stigmella atricapitella*. The sixth, seventh and eighth VC61 records occurred on 20.x.2017, 10.xi.2018 and 13.xi.2018 respectively when I found mines in Pedunculate Oak leaves in Walkington, Cottingham and Beverley Westwood. The previous records were from Hessle and Cottingham in 2015 (Beaumont *et al*., 2016) and Howsham, Risby and North Cliffe Wood in 2016. Identification issues in the past mean that the status of this species in Yorkshire is unclear, but it is likely to be more common and widespread than records suggest (Nunn & Warrington, *op. cit.*).

4.062 *Stigmella samiatella*. The second VC61 record occurred on 29.x.2018 when I found mines in Sweet Chestnut *Castanea sativa* leaves in Hessle. The previous record was from Hessle in 2015 (Beaumont *et al*., 2016). Identification issues mean that the status of this species in Yorkshire is unclear, but it is likely to be more common and widespread than records suggest (Nunn & Warrington, *op. cit.*).

4.074 *Ectoedemia sericopeza*. The first VC61 record occurred on 06.vii.2018 when I found mines in Norway Maple *Acer platanoides* samaras in Hull. I subsequently caught an adult female at light in Skidby on 02.ix.2018, which CHF dissected to confirm the identity. The first Yorkshire record was from VC63 in 2017 (Beaumont *et al*., 2018).

4.075 *Ectoedemia louisella*. The second VC61 record occurred on 07.vii.2017 when I found mines in Field Maple *Acer campestre* samaras in Little Weighton, the same location as the first record (in 2016; Beaumont *et al*., 2017).

4.082 *Ectoedemia intimella*. The third and fourth VC61 records occurred on 09.xi.2017 and 31.x.2018 respectively when I found mines in Common Sallow *Salix cinerea* leaves at Allerthorpe Common and Houghton Moor. The previous records were from Broomfleet in 2014 (Beaumont *et al*., 2015) and 2016.

4.085 *Ectoedemia argyropeza*. The sixth and seventh VC61 records occurred on 12.x.2017 and 31.x.2018 respectively when I found mines in Aspen leaves in North Cliffe Wood. The previous records were from Newport in 2013 (Frost, *op. cit.*) and 2014, Melbourne in 2013, and Eastrington Ponds and North Cliffe Wood in 2016.

4.100 *Ectoedemia minimella*. The third VC61 record occurred on 18.x.2017 when CHF, IM and I found mines in Silver Birch *Betula pendula* leaves in Sherburn, and the fourth, fifth and sixth were from Allerthorpe Common (09.xi.2017), Kirby Grindalythe (23.x.2018) and Houghton Moor (31.x.2018). The previous records were from North Cliffe Wood in 2014 (Beaumont *et al*., 2015).

Figure 1 (see p47). *Stigmella regiella* mine on Common Hawthorn *Crataegus monogyna.* *A.Nunn*

Heliozelidae

6.003 *Heliozela sericiella*.

Figure 2. *Heliozela sericiella* mine on Pedunculate Oak *Quercus robor.* *A. Nunn*

The fourth VC61 record of *H. sericiella* occurred on 06.ix.2017 when I found mines (Fig.2, p48) in Pedunculate Oak leaves in North Cliffe Wood and the fifth, sixth, seventh and eighth were from North Cliffe Wood (03.ix.2018), Houghton Moor (31.x.2018), Risby (13.xi.2018) and Beverley Westwood (13.xi.2018). The previous records were from Holme-on-Spalding-Moor in 1992 (Box, *op. cit.*), Cottingham in 2015 and North Cliffe Wood in 2016.

6.004 *Heliozela resplendella*. The fifth VC61 record occurred on 06.ix.2017 when I found a mine in a Common Alder leaf at North Cave Wetlands. The previous records were from North Cliffe Wood in 2014 (Beaumont *et al.*, 2015) and 2015, Hull in 2015 and Cottingham in 2016.

Bucculatricidae

14.013 *Bucculatrix demaryella*. The fifth VC61 record occurred on 18.x.2017 when CHF, IM and I found mines in Silver Birch leaves in Sherburn, and the sixth and seventh occurred at Allerthorpe Common (09.xi.2017) and Houghton Moor (31.x.2018). The previous records were from Allerthorpe Common in 2013 (Frost, *op. cit.*) and North Cliffe Wood in 2014 and 2016.

Gracillariidae

15.036 *Phyllonorycter heegeriella*. The second and third VC61 records were confirmed on 27.iii.2017 and 07.iv.2018 respectively when I reared adults from mines in Pedunculate Oak leaves collected from North Cliffe Wood on 08.xi.2016 and Allerthorpe Common on 09.xi.2017. The first record was from Skipwith Common in 1984 (Sutton & Beaumont, *op. cit.*).

15.037 *Phyllonorycter tenerella*. The first Yorkshire record was confirmed on 02.iv.2017 when I reared an adult from a mine in a Hornbeam *Carpinus betulus* leaf collected from near Market Weighton on 01.xii.2016 (Beaumont *et al.*, 2018).

15.050 *Phyllonorycter cerasicolella*. The third VC61 record occurred on 14.ix.2017 when I found mines in Wild Cherry *Prunus avium* leaves in Hull and the fifth was from Allerthorpe Common on 09.xi.2017. The previous records were from York in 2006 (Box, *op. cit.*) and Hessle in 2016, with the fourth from Reighton Gap in 2017.

15.051 *Phyllonorycter lantanella*. The first VC61 record occurred on 31.x.2018 when I found mines in Wayfaring Tree *Viburnum lantana* leaves in North Cliffe and the second was from Cottingham on 12.xi.2018. The first Yorkshire record was from VC63 in 2015 (Beaumont *et al.*, 2016).

15.073 *Phyllonorycter lautella*. The third, fourth and fifth VC61 records were confirmed on 31.iii.2017, 01.iv.2018 and 11.iv.2018, respectively, when I reared adults (see front cover) from mines in Pedunculate Oak leaves collected from North Cliffe Wood on 08.xi.2016 and 10.x.2017, and Allerthorpe Common on 09.xi.2017. The previous records were from Skipwith Common in 1995 (Beaumont, 2002) and Allerthorpe Common in 2013.

15.080 *Phyllonorycter froelichiella*. The sixth VC61 record was confirmed on 13.iv.2018 when I reared adults from mines in Common Alder leaves collected from Cottingham on 15.ix.2017. The previous records were from Stamford Bridge in 1990 (Beaumont, *op. cit.*), Bubwith in 1995, Allerthorpe Common in 2013, Hessle in 2015 and Howden Marsh in 2016.

15.0931 *Phyllocnistis citrella*. The first Yorkshire record occurred on 23.ix.2018, when I found mines in lemon *Citrus* sp. leaves at a garden centre in Woodmansey and the second occurred at the same location on 08.xii.2018, when I found mines on a different plant. The stated origin of

both plants was the Netherlands. The species was added to the UK list in 2012 (Homan, 2012).

Bedelliidae

24.001 *Bedellia somnulentella*. The fourth VC61 record occurred on 18.x.2017 when CHF, IM and I found mines in bindweed *Calystegia* sp. leaves in Sherburn and the sixth was in Brantingham on 30.x.2017. The previous records were from Hull in 2014 (Beaumont *et al.*, 2015) and Brantingham in 2016, with the fifth from Reighton Gap in 2017.

Coleophoridae

37.026 *Coleophora violacea*. The third and fourth VC61 records occurred on 15.vi.2017 and 30.vii.2017 respectively when I found larval cases on Silver Birch leaves in North Cliffe Wood, the same location as the previous records (in 2014 and 2016; Beaumont *et al.*, 2015).

37.029 *Coleophora orbitella*. The second VC61 record occurred on 31.x.2018 when I found a larval case on a Silver Birch leaf at Houghton Moor. The first record was from North Cliffe Wood in 2014 (Beaumont *et al.*, 2015).

37.052 *Coleophora ibipennella*. The second VC61 record occurred on 01.v.2017 when I found a larval case on a Pedunculate Oak in North Cliffe Wood, the same location as the first record (in 2015; Beaumont *et al.*, 2016).

Acknowledgements

I would like to thank Harry Beaumont, Charles Fletcher and John Langmaid for verifying the identity of scarce and/or difficult species, and Charles Fletcher for his comments on a draft of this article.

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Leaf-mining flies (Agromyzidae) new to the Yorkshire Diptera list: Part 2

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Introduction

Folowing Warrington (2017, 2018a) thirteen more Agromyzidae species are hereby added to the Yorkshire Diptera list. Nine of these records are based on adult material collected by the author (BPW), with the remaining four species being added to the Yorkshire list based on their distinctive larval mines, three by BPW and one by Robert Homan (RH). Eleven additions were recorded from East Yorkshire (VC61), whilst two were discovered in South-west Yorkshire (VC63).

Agromyza abdita Papp in Papp & Černý 2015

Males were collected by BPW from a brownfield site in Hull (VC61) on 31.v.2018 and 05.vi.2018 which represented the first record of this species in the UK (Warrington 2018b). Additional males were collected by BPW from Hessle (VC61) on 31.vii.2018 and Tickton (VC61) on 22.vi.2018.

Agromyza dipsaci Hendel 1927

The characteristic larval leaf mines of this leaf-mining fly were observed on Wild Teasel *Dipsacus fullonum* by RH on 11.vii.2018 at Sheffield Botanical Gardens (VC63) and at Sheffield Norfolk Park (VC63) on 12.vii.2018. This is relatively widespread and may well be present elsewhere in the county.

Amauromyza morionella (Zetterstedt 1848)

Distinctive leaf mines on woundwort (*Stachys)* were collected by BPW on 22.x.2016 from a small wooded area in Hull (VC61). Although similar to the mines of *A.labiatarum* on the same host plant, the frass pattern is sufficiently different to separate the two.

Aulagromyza heringii (Hendel 1920)

Larval leaf mines (Fig. 1, p52) were discovered on Ash *Fraxinus excelsior* by BPW on 25.x.2016, at Hessle (VC61), which resulted in several adults being successfully reared. This agromyzid fly is unusual in that larval mines are only found between late September and early November.

Figure 1 (see p51). Larval leaf mine of *Aulagromyza heringii* on Ash *Fraxinus excelsior.* *B.Warrington*

Hexomyza simplicoides (Hendel 1920)
BPW collected several larval galls on willows *Salix* on 10.xii.2018 from Thorne Moors (VC63). The galls (Fig. 2) were opened to ensure that the larvae were those of the Agromyzid. Contrary to some literature, the larva over-winters and pupates in early Spring.

Figure 2.
Left: Larval galls of *Hexomyza simplicoides* on a willow stem. *B.Warrington*
Right: Opened gall of *Hexomyza simplicoides* showing Agromyzid larva. *B.Warrington*

Liriomyza angulicornis (Malloch 1918)
A single female was swept from salt marsh along the Humber estuary, Hessle (VC61) by BPW on 16.viii.2018. Although female *Liriomyza* are frequently very difficult to determine, this one possesses distinctive features which allow a positive determination.

Liriomyza latipalpis Hendel 1920
Adults were collected from salt marsh in Hessle (VC61) by BPW on 06.viii.2018. Adults were on the wing until the end of August. This fly forms mines on arrowgrasses (*Triglochin)*.

Liriomyza soror Hendel 1931
Males were collected by BPW from a brownfield site in Hessle (VC61) on 27.v.2018, 28.v.2018 and 27.vi.2018. This is a rather scarce leaf-mining fly which forms mines on *Cirsium* thistles.

Melanagromyza lappae (Loew 1850)
BPW obtained puparia from the stems of burdock (*Arctium)* during the autumn and winter of 2017 and the early months of 2018, from various sites across East Yorkshire (VC61), which resulted in adults being successfully reared (Warrington, 2018c). This insect was excluded from the Yorkshire list by Grayson (2018) but is hereby re-instated.

Metopomyza nigriorbita (Hendel 1931)
Three males were collected by BPW on 14.v.2018 from vegetation at Broomfleet Washlands (VC61) and dissected to confirm the determination. This appears to be a rare species in the UK, with the National Agromyzidae Recording Scheme holding only four other records.

Phytomyza sphondyliivora Spencer 1957
Adult males were collected by BPW from vegetation in Hessle (VC61) during April 2017 (earliest collection date 09.iv.2017). This fly forms mines on Hogweed *Heracleum sphondylium*.

Phytomyza myosotica Nowakowski 1959
A single male was swept by BPW on 27.vi.2018 from a brownfield site in Hessle (VC61). This is a tricky insect to determine and detailed examination of the genitalia is required.

Phytomyza pimpinellae Hendel 1924
BPW collected a single male on 13.iv.2017 from hedgerow scrub along the Humber estuary, Hessle (VC61). A relatively scarce agromyzid which forms mines on burnet-saxifrages (*Pimpinella)*.

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Predation of Great Pond Snails at Wetwang

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Introduction
While visiting a dew pond near Wetwang in September 2018 as part of the Yorkshire Wildlife Trust survey of dew ponds on the Yorkshire Wolds, numerous Great Pond Snails *Lymnaea stagnalis* were found stranded out of water. The pond (SE93696221) at Life Hill Farm had dried up as a consequence of the hot summer that year, during which there was little rain. We made

five visits to the pond between July and November 2018 with specific attention being paid to Great Pond Snails. As there was no clear evidence of any other species of stranded aquatic mollusc, all references below to snails or shells at the Wetwang pond refer to this species.

Visits 1 and 2

On the first visit (31/7/2018) numerous Great Pond Snails were seen at the surface of the pond, which was clearly below its maximum level. No stranded snails were noted.

On the second visit (1/9/2018) the pond lacked any apparent free water overlaying the muddy base. There were many Great Pond Snails stranded on the mud, some were alive but others were just empty shells. An accumulation of damaged empty shells was noted on the outer edge of the muddy drawdown zone. The damage to the shells was clearly suggestive of predation and so this accumulation is referred to as Midden 1.

Visit 3

On the third visit (27/9/2018) the pond contained water again but the level was lower than on the first visit. Several live snails were seen at the water surface but numerous empty shells were present on the muddy drawdown zone, including in three main accumulations.

Midden 1 was a dense accumulation (about 0.3 x 0.2m) of damaged shells on mud close to the edge of a slight embayment of the surrounding scrub-covered bank (Figure 1, p56).

Midden 2 was a more dispersed accumulation of damaged shells. It was separated from midden 1 by only a few centimetres.

Midden 3 was a dispersed accumulation of damaged shells on the same side of the pond as the other two middens but was further from the bank.

It was notable that there was virtually no emergent vegetation between the three middens and the water's edge; this contrasted with the band of emergent aquatic vegetation around much of the rest of the pond.

An attempt was made to collect all empty shells (damaged and undamaged) from middens 1 and 3. A sample of empty shells lying scattered over the drawdown zone was also collected. The total numbers of shells collected were: 150 (midden 1), 89 (midden 3) and 102 (scattered shells). All these shells were examined for signs of damage. Less than 5% of shells from middens 1 and 3 were completely intact. The vast majority (≥85%) from these two middens showed the same pattern of damage. There was extensive damage to the spire (spire missing or only a small part remaining) which sometimes extended slightly into the body whorl; in most cases the aperture rim was intact (Figure 2, p56). This type of damage is probably indicative of a predator trying to gain access to the body of the snail by breaking the spire. In contrast, most (82%) of the scattered shells were completely intact, with a variety of damage noted in the other scattered shells.

The maximum width of the aperture was measured in 30 shells per collection. All selected shells had an intact aperture rim (shells from middens 1 and 3 had a damaged spire; scattered shells were completely intact). The mean aperture diameters of these shells were similar: midden 1 (1.89cm, SD 0.15), midden 3 (1.83cm, SD 0.14), scattered shells (1.99cm, SD 0.13).

Visits 4 and 5 (baited shell investigation)
At visit 4 (3/11/2018), 18 empty and undamaged shells were baited (filled) with wet cat food and 10 with small pieces from a wild-bird fat ball. The baited shells were placed where midden 1 had been and a trail camera positioned to film animals investigating the baited shells. The water level in the pond was similar to that on the third visit.

At visit (18/11/2018), the camera was retrieved and all shells that could be found were collected from the baited area. The water level in the pond was slightly higher than on the first visit.

The findings of the baited-shell investigation are included in the discussion below. It is acknowledged that the use of a surrogate food source has limitations in terms of identifying the predator of the snails.

Discussion
It seems highly likely that Great Pond Snails at Wetwang were predated by Brown Rats *Rattus norvegicus* based on the following findings (although no rodent faeces were noted near the middens or the baited area):

a) A total of 165 20-second video clips were recorded, of which about 60% showed Brown Rats visiting the site at night, especially on the first night after the baited shells were laid.

b) At least 14 video clips showed a rat picking up and holding an object with its front paws whilst biting into the object. Some crunching sounds could be heard suggesting that the rat was biting into a snail shell.

c) Other potential snail predators recorded on video around the baited area were mouse and Woodcock *Scolopax rusticola*; both only single individuals seen once. There were also several sightings of Pheasant *Phasianus colchicus* but there was no video evidence for any of these species showing interest in snail shells.

d) The presence of narrow rat-sized runs, in scrub beside the pond, which opened directly behind middens 1 and 3.

e) Brown Rats can exploit a wide range of food sources including various freshwater snail species, and middens of their empty (predated) shells near to water have been reported (Parisi & Gandolfi, 1974 and Nieder *et al.,* 1982 in the Po River valley in Italy; Gordon *et al.*, 2016 in a flooded gravel pit in Cambridgeshire).

f) The main type of shell damage observed at Wetwang was consistent with a rat having bitten through the narrow spire while perhaps holding the body whorl steady with its front paws. It would seem likely that the narrow spire would be easier to bite through than the swollen body whorl. A different pattern of shell damage (to the aperture rim and body whorl) has been reported for River Snails *Viviparus viviparus, V. ater* and other aquatic gastropods predated by rats (Parisi & Gandolfi, *op. cit.*; Nieder *et al., op. cit;* Gordon *et al., op. cit*). This difference is probably, in part, related to shell shape.

g) At Wetwang, the main type of damage noted in the shells (10 damaged, 2 intact) collected from the baited-shell study was the same as in shells collected earlier from middens 1 and 3. The mean maximum aperture width of nine shells with an intact aperture rim was 2.0cm (SD 0.14).

Figure 1 (p54). Midden 1 at Wetwang with predated Great Pond Snail shells *R.O. Shillaker*

Figure 2 (p54). Main type of damage to Great Pond Snail shells at Wetwang.
Top: Damage to spire.
Bottom: Damage extending into body whorl of three of these shells. *R.O. Shillaker*

Although it was not possible to determine if the shells collected 15 days after setting out baited shells were those that had been baited, it would seem likely that at least some were. Other damaged shells may have been fresh 'kills' or had been overlooked when the baited shells were put out.

h) There were no large stones near middens 1 and 2 which could have been used by a bird as an anvil to open a shell. A large concrete block was near midden 3 but no broken snail shell fragments were found on the block. In addition, the general consistency to the pattern of shell damage in the middens was not what might be expected following a more random smashing of a shell by a bird, e.g. Brown-lipped Snail *Cepaea nemoralis* shells broken by Song Thrushes *Turdus philomelos* (see Fig. 93 in Cameron, 2016).

Brown Rats are competent swimmers at and below the water surface (see references cited by Gordon *et al., ibid*.) and have been reported to dive down to collect freshwater molluscs (Parisi & Gandolfi, *ibid*.). However, it seems likely that Great Pond Snails at the Wetwang pond were predated when they became stranded as the pond dried up. The evidence in favour of this is:

a) Although a large number of Great Pond Snails was seen at the water surface during the first visit to the pond, no middens were noted. It would also seem unlikely that there would have been such a large number of snails in the pond if rats had been predating snails whilst they were in the water.

b) No new middens were noted during the final two visits when there was again water in the pond (shells had been removed from middens 1 and 3 during the third visit as part of our investigation).

Based on comparing the remains of River Snails in middens with live snails in adjacent water sites, Gordon ***et al.*** (***op. cit.***) suggested that predation by rats could be size-selective for larger snails, although other possible explanations for their findings were noted. In contrast, more limited data from our observations at Wetwang provide no evidence of shell-size selection. The mean sizes of predated shells (based on aperture diameter) from middens 1 and 3 were similar to that of stranded intact shells collected from elsewhere on the drawdown zone. It is acknowledged, however, that it is possible that the shell composition of middens, which were located near the outer edge of the drawdown zone, might not have been representative of the full range of the snails eaten by rats. Nieder ***et al***. (***op. cit.***) reported that larger snails were carried furthest from the point of capture by rats; smaller ones were eaten directly or were carried only a short distance (smaller ones were also crushed).

Conclusion

The balance of evidence suggests that stranded Great Pond Snails at the Wetwang dew pond were predated by Brown Rats.

Acknowledgements

We thank Mr and Mrs Grace for allowing access to their farm pond at Wetwang. We are also grateful to Alex Pickwell for his input into this investigation, to Africa Gómez for help to obtain references and for the comments from the anonymous reviewer.

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Some Records of Avian Chewing Lice (Mallophaga) in Yorkshire

Barry Nattress

Editors' note. This paper and the following one from Barry Nattress are somewhat incomplete, lacking references and dates of records. Unfortunately, Barry, who had been ill for some time, died before he was able to complete the papers, but we thought that it would be a tribute to him to publish this important work in its unfinished state rather than leave it unpublished.

Introduction

The Mallophaga comprise an order within the Phthiraptera and are split into three sub-orders, the Amblycera, the Ischnocera and the Rhynchophthirina, the latter one being confined to elephants and some African pigs. They are small (0.5 – 10 mm long), wingless insects living as ectoparasites on birds and some mammals. The head is fairly broad, with reduced eyes (and with no ocelli) and short antennae (which are concealed in the Amblycera). The body is dorso-ventrally flattened, with the prothorax distinct from the other two thoracic segments, which, in some genera, are partly fused together forming the pterothorax. The legs have one or two tarsal segments, the last of these bearing two claws (on avian hosts, only one on mammals) with which the insect clings tightly to the feathers (or fur) of its host. There are three nymphal stages, with no obvious metamorphosis. There are 4,397 species known (Price *et al.*, 2003) and about 500 of these have been recorded in Britain. Chewing lice feed mainly on particles of skin and feathers (or fur). Some species have been known to take dried blood, feeding at any small wounds or abrasions of the host. Chewing lice are monoxenous (with a single host) or oligoxenous (with several related hosts) parasites. Some are of great economic importance when they infest domestic livestock, especially poultry.

I have been able to trace six historical records of Mallophaga in Yorkshire, two being Amblycera, the rest, Ischnocera. These are *Menopon lutescens* Nitzsch, recorded on the eggs of Lapwing *Vanellus vanellus*. They apparently await the emerging chick. The location given is Shipley, Yorkshire (Thompson, 1938). *Myrsidea thoracica* (Giebel, 1874) on Mistle Thrush *Turdus viscivorus*. The record simply states Yorkshire (Clay, 1966). *Ciconiphilus pectiniventris* (Harrison, 1916) was found on a Greylag Goose *Anser anser*, again, the record simply states Yorkshire (Price & Beer, 1965). *Philopterus fringilla* (Scopoli, 1772) (but originally shown as *P. subflavens* (Geoffroy, 1762)) was found on a House Sparrow *Passer domesticus* near Kirby Moorside. The

remaining two species do not come from published papers, but are specimens on microslides in the Museum of New Zealand. These are *Austromenopon brevifimbriatum* (Piaget, 1880) Specimen Number A1.021251; this was found on a Fulmar *Fulmaris glacialis* at Spurn and *Saemundssonia occidentalis* (Kellog, 1896) Specimen Number A1.023828 which was again found on a Fulmar, this time at Hornsea. Both of these records can be found on the museum web site.

Materials and Methods

The lice were removed from the feathers of dead hosts using fine forceps and with the aid of a stereo microscope. The lice were initially stored in 70% alcohol. They were then processed and mounted on micro-slides in either Practamount or polyvinyl-lactoglycerol and examined with both bright field and phase contrast with a Zeiss compound microscope with magnifications ranging from x50 to x500. The scientific names of birds follow Peterson, 2002.

Sub-order Amblycera

Family Menoponidae

Bonomiella sp.

A member of this genus has now been recorded from the Woodpigeon *Columba palumbus* from Methley, SE3725. It is unfortunate that males are required to identify to species. Only females were present on the host.

***Menopon gallinae* L. 1758**

First described from the domestic fowl *Gallus gallus domesticus* L. 1758, it has now been recorded from the same host in West Ardsley, SE2725 (Emerson, 1956).

***Menacanthus agilis* (Nitzsch, 1866)**

First described from the Black Redstart *Phoenicurus ochruros*, it has now been recorded from the Chiffchaff *Phylloscopus collybita* from Linton, near Wetherby, SE3946. (Price,1977).

***Menacanthus eurysternus* (Burmeister, 1838)**

First described from the Magpie *Pica pica*, it has now been recorded from the Carrion Crow *Corvus corone* from Bretton Crossroads, SE2714.

***Menacanthus lyali* Rodriguez Caabeiro *et al.*, 1983**

First described from the Red-legged Partridge, it has now been recorded from the same host from Newthorpe, near Sherburn in Elmet, SE4733. (Rodriguez Caabeiro *et al.*, 1983).

***Menacanthus pallidulus* (Neumann, 1912)**

First described from the Chinese Bamboo Partridge *Bambusicola thoracica*, it has now been recorded from the Grey Partridge *Perdix perdix*, from Sherburn in Elmet, SE5633. (Sychra, 2005).

***Myrsidea rustica* (Giebel, 1874)**

First described from the Swallow *Hirundo rustica*, it has now been recorded from the same host from Low Bradley, near Keighley, SE0048. (Conci, 1942).

***Myrsidea thoracica* (Giebel, 1874)**

First described from the Mistle Thrush, it has now been recorded from the Blackbird *Turdus merula* from Ardsley, near Barnsley, SE3805.

Sub-order Ischnocera
Family Philopteridae

***Brueelia chrysomytris* (Blagoveshtchensky, 1940)**
First described from the Goldfinch *Carduelis carduelis* , it has now been recorded from the Siskin *Carduelis spinus* from Sherburn in Elmet, SE4633.
***Brueelia domestica* (Kellog & Chapman, 1899)**
First described from the Swallow *Hirundo rustica erythrogaster* in the United States, it has subsequently been recorded in Turkey on the Swallow *Hirundo rustica rustica* (Acici *et al.*, 2011). It has now been recorded on the same host in West Ardsley, SE2725.
***Brueelia gracilis* (Burmeister, 1838)**
First described from the House Martin *Delichon urbica*, it has now been recorded from the same host from Lower Bradley, near Keighley, SE0048. (Séguy,1944).
***Campanulotes bidenatus* (Scopoli, 1763)**
First described from the Woodpigeon, it has been recorded from the same host from Carlton, near Goole, SE6523 (Tendeiro, J., 1969).
***Coloceras damicorne* (Nitzch, 1866)**
First described from the Woodpigeon, it has now been recorded from the same host from Ringhay Wood, near Micklefield, SE4535 (Tendeiro, 1973)
***Columbicola claviformis* (Denny, 1842)**
First described from the Woodpigeon, it has now been recorded from the same host from Methley, SE3725. (Adams *et al.*, 2005).
***Columbicola columbae* (L., 1758)**
First described from the Rock Dove *Columba livia*, it has now been recorded from the feral Rock Dove from West Ardsley, SE2725.
***Goniocotes chrysocephalus* Giebel, 1874**
First described from the Pheasant, it has now been recorded from the same host from Carlton, near Goole, SE6523 (Kéler, 1939).
***Goniocotes gallinae* (DeGeer, 1778)**
First described from the domestic fowl, though probably a wild fowl was the original host. It has now been recorded on a domestic fowl from West Ardsley, SE2725 (Emerson, 1956).
***Goniocotes microthorax* (Stephens, 1829)**
First described from the Grey Partridge, it has now been recorded from the Red-legged partridge from Carlton, near Goole, SE6523.
***Goniocotes obscurus* Giebel, 1874**
First described from the Red-legged partridge, it has now been recorded from the same host from Carlton, near Goole, SE6523.
***Goniodes colchici* Denny, 1842**
First described from the Pheasant, it has now been recorded from the same host from Sherburn in Elmet, SE5633. (Clay, 1940).
***Lipeurus capensis* (L., 1758)**
First recorded from the Red Jungle-fowl *Gallus gallus* – the ancestor of the domestic fowl, it has now been recorded from the Pheasant, from Carlton, near Goole, SE6523. (Clay, 1938).
***Lipeurus maculosa* Clay, 1938**
First described from the Pheasant, it has now been recorded from the same host from Sherburn in Elmet, SE 5633.

***Penenirmus albiventris* (Scopoli, 1763)**
First described from the wren *Troglodytes troglodytes*, this species has now been recorded from the same host from Low Bradley, near Keighley, SE0048.
***Philopterus modularis* Denny, 1842**
First described from the Dunnock *Prunella modularis*, it has now been recorded from the same host from Moortown, Leeds, SE3138.

***Philopterus picae* Denny, 1842**
First recorded on the Magpie *Pica pica*, it has now been recorded on the same host from West Ardsley, SE2725.
Philopterus citrinella (Schrank, 1776)
First recorded from the Yellowhammer *Emberiza citrinella*. The original description by Schrank did not give sufficient information to identify the species (Palma & Price, 2006). It is recommended that the synonym established by Clay & Hopkins should be used (Clay & Hopkins, 1954). This species has now been recorded on the Reed Bunting *Emberiza schoeniculus* from Rodley NR, SE2336.
***Philopterus turdi* (Denny, 1842)**
First described from the Song Thrush *Turdus philomenus*, it has now recorded from the Blackbird from Sherburn in Elmet, SE5633.
***Strigiphilus laticephlaus* (Uchida, 1949)**
First described from the Tawny Owl *Strix aluco*, it has now been recorded from the same host from Edlington, South Yorksire, SE5698.

Discussion
The mechanisms of dispersal of chewing lice are poorly understood (Calvete et al, 2003). They can move between individual hosts in three ways. This can be by direct contact of birds or via birds using the same roost or nesting place. This is known as horizontal transmission. They can move from parent to young or vertical transmission. They can also transfer by phoresy, which is a form of dispersal in which the louse would cling to an insect, quite often a Hippoboscid fly, and be transported by the fly to a new host.

Acknowledgements
I would like to thank Dr Vince Smith of the Natural History Museum for his help in obtaining Tendeiro's 1976 paper.

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An update of Feather Mites & Quill Mites (Syringophilidae) in Yorkshire

Barry Nattress

Feather Mites (Astigmata)

Family Analgidae Trouessart and Mégnin, 1884
Analges passerinus (L., 1758)
Previously recorded from the Greenfinch *Carduelis chloris*, it has now been recorded on a Goldfinch *Carduelis carduelis* from Grimwith Reservoir, North Yorkshire SE0764.
Analges sittae Mironov, 1985
First described from the Nuthatch *Sitta europaea*, it has now been recorded from the same host from Morley, West Yorkshire SE2563.
Megninia cubitalis (Megnin) 1877
First described from the Domestic Fowl *Gallus gallus domesticus*, it has now been recorded on the same host in West Ardsley, West Yorkshire SE2725.

Family Kramerellidae Gaud & Mouchet, 1961
Dermonoton sclerourus Gaud, 1980
First described from the Barn Owl *Tyto alba*, it has now been recorded from the same host from Chapeltown, South Yorkshire SK3695.

Family Xolalgidae
Glaucalges tytonis Dabert, Ehrnsberger & Dabert, 2008
First described from a Barn Owl in Poland, it has now been recorded from the same host in Chapeltown SK3695.

Family Proctophyllodidae Robin, 1877
Proctophyllodes glandarinus Koch, 1841
Previously recorded on the type host, the Jay *Garrulus glandarinus*. It has now been recorded from the Crossbill *Loxia curvirostra* from Sherburn in Elmet, North Yorkshire SE4633.
Proctophyllodes tenericaulis Atyeo & Vasilev, 1964
Originally described from both the Mistle Thrush *Turdus viscivorus* and the Crested Lark *Galerida cristata*, both in Bulgaria. It has now been recorded from the Mistle Thrush from Morley SE2563 and the Robin *Erithathacus rubecula* from Sherburn in Elmet SE4633.
Proctophyllodes troncatus Robin, 1877
Previously recorded from the type host, the House Sparrow *Passer domesticus*, it has now been recorded on the Tree Sparrow *Passer montanus* from Sherburn in Elmet SE4633.
Proctophyllodes vitzhumi Fritsch, 1961
First recorded from a Nuthatch from both Czechoslovakia and France. It has now been recorded from the same host from Morley SE2563.

Family Pterodectinae Park & Atyeo, 1971
Pterodectes rutilus Robin & Megnin, 1877
First described from the House Martin *Delichon urbica*, it has now been recorded from the Swallow *Hirundo rustica* from West Ardsley SE2725.

Family Pteronyssinae Oudemans, 1941
Pteronyssoides parinus Koch, 1840
First described from the Blue Tit *Cyanistes caeruleus*, it has now been recorded from a Tree Sparrow from Sherburn in Elmet SE4633.

Quill Mites (Prostigmata)

Family Syringophilidae Lavoipierre, 1953
Betasyringophiloidus schoeniclus Skoracki, 2002
First described from the Reed Bunting *Emberiza schoeniclus* from Slovakia, Poland, Kazakhstan and Mongolia. It has now been recorded from the same host from Rodley NR, Leeds, West Yorkshire SE2336.
Syringophiloidus montanus Skoracki, 2002
First described from a Tree Sparrow in Slovakia, it has now been recorded from the same host from Sherburn in Elmet SE4633.
Syringophiloidus glandari (Fritsch, 1958)
First described from a Jay from Germany. It has now been recorded from a Magpie *Pica pica* from West Ardsley SE2725.
Syringophilopsis garrulus Skoracki & Dabert, 2002
First described from the Jay from Africa. It has now been recorded from the same host from Sherburn in Elmet SE4633.

Obituary: Barry Nattress 1936 -2018

Barry was born in Rothwell, one of three sons to Doris and John Nattress. On leaving Rothwell Grammar School he took an electrical engineering apprenticeship at the Yorkshire Electricity Board where he worked until his retirement in 1993. He met and married Gladys, then Secretary of the Wakefield Branch of the YHA, in 1960. They had three children, two sons and a daughter.

From an early age Barry had an interest in natural history, and rapidly became a fine naturalist and an exceptionally fine photographer (Fig.1, p65). His initial interest and photographic work was on birds and flowers, where he no doubt benefitted from being in the field with the renowned Arthur Gilpin. A visit to Hong Kong to see his brother at the time of Barry's fiftieth birthday, led to extensive travels to exotic places including the Galapagos, Costa Rica and Borneo, substantially widening his photographic portfolio. Peter Larner first knew him as a photographer with some very good pictures of birds. His Presidential Address to the Leeds Naturalist's Club in 1993 (he was again president in 1999-2000) was entitled *Hong Kong, a Natural History* and had memorably excellent photographs.

Figure 1. Barry Nattress photographing a Frog Orchid *Coeloglossum viride* on Vatersay in the Outer Hebrides in 1993. *C.Eadon*

In this period Barry extended his natural history photography to more difficult and unusual subjects. A talk in 1999 by John Bowers on moths, illustrated with photographs of moths on egg boxes, brick walls etc., had Barry saying to his companion David Baker "we can do better than that". This single comment started them on a joint project to catch, record and photograph moths, giving Barry a further reason to instruct David on how to take better photographs. Barry was ever a perfectionist. At the time of his death his home moth list stood at 340 species.

By this time Barry was combining photography with his other interest in microscopy. He was a founder member of the Leeds Microscopy Society which emerged from Adult Education classes at Leeds University in 1991. At his suggestion the Society held an annual open meeting attracting microscopists from all over the country. Microscopy, together with photography, was put to work for his interest in natural history. One set of taxa that needed the skills of a microscopist were the Tardigrada (Water Bears). When he published a joint paper in *The Naturalist* in 2014[1] there were only 6 species on the Yorkshire list and his paper added another 20 species, with multiple records of several of them.

However, Barry's main contribution to Yorkshire and UK natural history concerned feather mites and quill mites. In 1995 he published a paper on feather mites[2]. At that time there were no records of feather mites in Yorkshire. By examining dead birds supplied by friends and fellow

1 Nattress, B., Smith M. and Ramsbottom J. (2014). Some records of tardigrades in Yorkshire, *The Naturalist,* 139: 167-72.

2 Nattress, B. (1995). Some records of feather mites (Acari:Astigmarta) in Yorkshire. *The Naturalist* 120: 31-32.

naturalists he identified 15 mites from 12 bird species covering 12 Yorkshire sites. His next paper further extended geographic coverage by using bird specimens sent to local museums[3]. This brought the list up to 39 species of feather mites from 31 bird species.

Whilst there was no official NBN list of the taxa, 12 species had not been recorded previously from material collected in the UK. A subsequent paper[4] raised the Yorkshire total to 61. The additions included at least 14 species not previously recorded in the UK, including 2 that were new to science[5]. A final paper, submitted to the editors of *The Naturalist* shortly before Barry's death (see p63) and provisionally entitled *An update of Feather Mites & Quill Mites in Yorkshire,* lists another 11 species of feather mites, of which 4 appear to be new to Europe, with another 2 new to the UK.

In 2005 Barry received the carcase of a Dunnock (*Prunella modularis*) that had been killed by a cat. As well as feather mites he found what proved to be quill mites of the genus *Tortola* but a species new to science, *Tortola modularis*[6]. A subsequent paper summarising his subsequent research lists 14 species of quill mites for Yorkshire; there were none previously. Of these, three were new to science and all were first records for the UK. The 'Update' paper already referred to gives a further 4 species, bringing the Yorkshire total to 18. All these additions are apparently new to Europe.

In the last few years Barry examined additional taxa from bird corpses: avian chewing lice or feather lice, *Mallophaga*. These are typically larger and better known than feather and quill mites. Most bird ringers will have come across them, and for many years bird observatories collected and preserved them for identification by the British Museum (JKB was doing this on Lundy Island in 1959). Doubtless they will have been collected at some time, if not now, by Spurn Bird Observatory. Some biting lice on poultry, game birds and pigeons are classed as agricultural pests and hence have been well studied. Even so Barry was able to trace only six historical records for Yorkshire[7] and, from the avian carcases he has examined, added 27 species to the Yorkshire list. 17 of these appear not to have been previously recorded in the UK.

Some, but we are not sure precisely how many, were new to Europe.

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3 Nattress, B. (2006). Further records of feather mites (Acari: Astigmata) in Yorkshire, *The Naturalist* 131: 95-98

4 Nattress, B. (2012). Some further records of feather mites (Acari: Astigmata) in Yorkshire. *The Naturalist* 137: 207-211.

5 Dabert, J, Nattress, B. & Labrzycka, A. (2010). *Anhemialges bakeri* sp. nov. (Analgoidea, Analgidae) – a new species of feather mite from the Common Chiffchaff (Passeriformes, Sylviidae) from England. *Acta Parasitologica*, 55(4): 392-398.

Dabert, J., Nattress, B., and Dabert, M., (2008). *Xoloptes blaszaki* sp. nov. (Pterolichoidea: Pterolichidae) – a new species of feather mite from *Alectoris rufa* (Galliformes: Phasianidae) from Europe with DNA barcode data. *Annales Zoologici (Warszama*) 58 (2): 391-396.

6 Nattress, B. and Skoracki, (2007). Quill mites of the Family *Syringophilidae*, Lavoipiere, 1953 (Acari:Cheyletoidea) Parasitic on Birds (Aves) in England. *Genus* 18(1): 139-145.

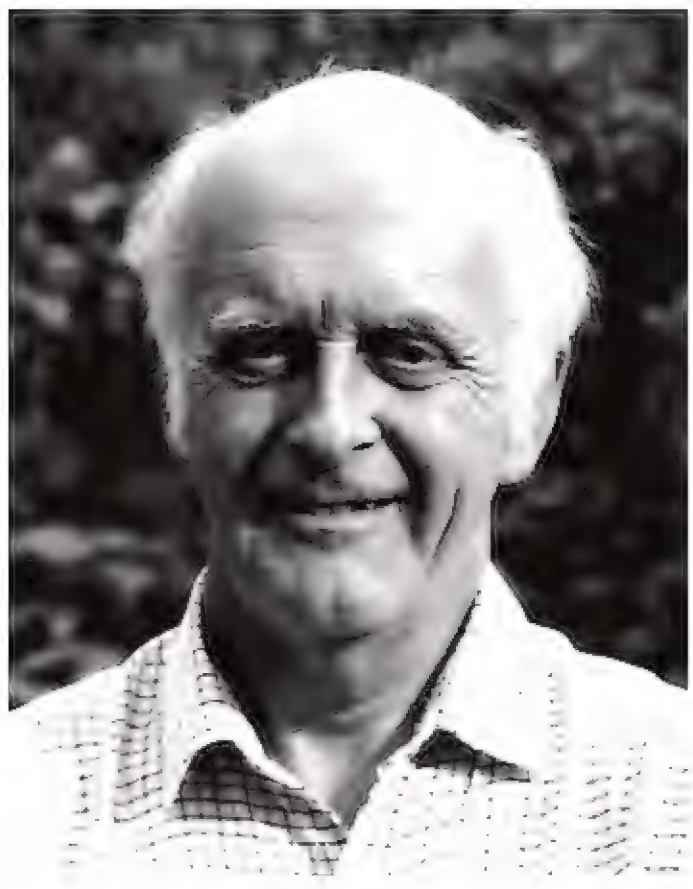
7 Nattress, B. (2019). Some Records of Avian Chewing Lice (Mallophaga) in Yorkshire. *The Naturalist* 144 58-62 (this issue).

Summarising Barry Nattress's work on bird parasites, he has added 96 species to the Yorkshire list, of which 63 appear to be new to the UK, at least 8 new to Europe and has found 5 species new to science. His specimens, carefully mounted and preserved, have been deposited with the Natural History Museum in South Kensington. By any standards this is a remarkable achievement, in a field where very few have previously ventured. Barry must be judged as one of the most important and significant Yorkshire naturalists of the post-war period. If we add to this his extensive work on Tardigrades, where he also had the status as a national expert, the message is reinforced. Much of this work was done late in his life when he was suffering a long-term progressive and debilitating illness.

Photography was always a passion for Barry. He was a perfectionist, ever willing to take whatever time was needed to get it right and he applied this passion to his love of natural history, with the results we have seen. But Barry in no way corresponded to the usual picture of a fanatical naturalist. On the contrary he was outgoing, friendly and funny, with a wicked sense of humour and with many friends. He will be sadly missed by them all and above all by Gladys and his children and grandchildren.

JKB/DB

Obituary: Geoffrey Wilmore 1941 – 2018



Geoffrey Thomas Duerden Wilmore was born on 2 January 1941 in the old Keighley Victoria Hospital and lived all his life in the Keighley area, apart from a brief period in Bradford in the 1980s. His interest in natural history was sparked by the gift of two books as birthday presents at the age of ten. One was T.A. Coward's pocket-sized *Birds of the British Isles* and the other was *Wandering with Nomad* by the naturalist and BBC Home Service radio broadcaster Norman Ellison, alongside whom Geoffrey's father had fought at Ypres Salient in the First World War. Geoffrey's first interest was in birds. He would take birdwatching walks along the Leeds-Liverpool Canal, the River Aire and into the local woodlands but he did not join any local society.

At the age of fourteen Geoffrey left Bradford Grammar School to work in the family business 'Wimsol', manufacturing bleaches and detergents and later, after the business was bought by Jeyes Group in the 1960s, as a junior executive in Jeyes. During this time, extended periods at night school and on day release gaining business qualifications left little time for him to develop his natural history interests. Geoffrey stayed with Jeyes for four years until he realised (in his

own words) that he was 'a square peg in a round hole' and unsuited to big business. So he left Jeyes to become a mature student reading Geography at Leeds University in 1970, despite having neither an O level or A level in Geography, but gaining entrance on the basis of his Certificate in Business Management! He was probably the only freshman in that year at Leeds to be studying Geography virtually from scratch, with no prior exam qualifications, and he was easily the oldest member of the 70-strong intake. He had a young family to support at this time and this was a challenging decision but one that he did not regret.

Having developed a good rapport with staff at Cliffe Castle Museum in Keighley whilst researching his final year thesis 'The urban development and growth of Keighley since the Enclosure Award in 1780', Geoffrey left University in July 1973 to work at the Museum on a voluntary basis. In 1974 the new Bradford Metropolitan District created the Biological Data Bank at Cliffe Castle Museum, one of the very first such units in local government in England. Geoffrey became the unofficial Assistant Ecologist to Jack Lavin, the unit's first Field Officer. His first major task was a Phase 1 Habitat Survey of all land parcels in Bradford Metropolitan District.

Later the scope of the Unit expanded to cover all five metropolitan districts of West Yorkshire and, as staffing increased, Geoffrey's role evolved to being virtually wholly involved with fieldwork and ecological evaluation, together with training young ecological appointees in basic aspects of plant survey and ecological principles. Many areas identified in the Phase 1 Survey work as being of good quality and requiring more detailed survey and evaluation eventually became Local Wildlife Sites and several were subsequently recommended by the Unit to English Nature as potential SSSIs, which, in due course, they became.

During the 1970s and 1980s the Biological Data Bank (later known as The West Yorkshire Ecological Advisory Service) formed valuable associations with many actively recording botanists who added considerably to the database, to the extent that, in the mid-1980s, Jack Lavin and Geoffrey were inspired to produce *The West Yorkshire Plant Atlas*, published by Bradford Council in 1994. In 1987, shortly following a talk to the Bradford Botany Group about his work, including on *The West Yorkshire Plant Atlas*, Geoffrey joined the Group and became recorder for the next thirty years.

During his over twenty years at Cliffe Castle, Geoffrey collaborated with John Rodwell in developing aspects of the National Vegetation Classification (NVC) system, including devising and leading numerous training courses in plant identification and NVC survey techniques.

Geoffrey developed an interest in shoddy (a mixture of shredded wool waste from Europe and beyond) which was spread onto vegetable crop fields as a fertiliser and contained seeds from strange and exotic plants. As a consequence, in 1994 his active role in the YNU increased when he took over as Alien Plant Recorder, a position he held until 2016. This interest in alien and casual flora led Geoffrey to produce *Alien Plants of Yorkshire*, a compilation of alien plant species records in the county, published by the YNU in 2000.

In 1995, Geoffrey ceased being employed by Bradford MDC and set himself up as a freelance ecological consultant. His work included Local Wildlife Site Surveys for Local Councils and surveys for various government agencies including English Nature (now Natural England). He also sat on several Local Government Local Biodiversity and Nature Conservation Steering

Groups. In 1998 the YNU Bulletin contained an article by Geoffrey (Wilmore, 1998) describing a system for establishing a detailed regional database of rare species and habitat, information of immediate use to planners, conservationists and others. By 2002 the intention was to extend the project to all five Yorkshire VCs (Wilmore, 2002). However, around the same time, data collection had begun for the *South Yorkshire Plant Atlas* (Wilmore *et al.*, 2011), a major project where Geoffrey collaborated with Jeff Lunn, Regional Manager for the Yorkshire and Humber Region of English Nature, and John Rodwell, and which benefitted greatly from Geoffrey's perseverance and leadership skills.

Geoffrey was elected President of the YNU for the period 2009–2010 (Wilmore 2010) and gave his Presidential Address on *Alien Plants – An Ecological Perspective* at Bingley on 20 November 2010 (Wilmore, 2011).

Geoffrey began work in 2002 on producing annual lists of additions to the British and Irish flora and incorporating many casual aliens which were not covered by Clement & Foster's *Alien plants of the British Isles* (1994), and continued until his last, the 17th list, completed in January 2018. He also produced periodical master lists and in his last years he devised a plan to produce an updated checklist of our flora. Despite the diagnosis of pulmonary fibrosis in May 2018 and the need for supplementary oxygen, he kept busy with his alphabetical checklist, a mammoth undertaking but a task he could do without much physical effort. The work was still underway at the time of his death. It is his family's wish that someone will take over Geoffrey's work and bring it to fruition.

Geoffrey was kind, sensitive, understanding and a very good teacher, always supportive and a good source of sound advice. His energy and enthusiasm for the subject have been described as both stimulating and infectious. His organisational skills and attention to detail were some of his admired qualities together with his reliability. It is difficult to imagine a future without Geoffrey's huge presence somewhere in the background. He will be regarded by future generations of naturalists as a giant of Yorkshire botany.

Wilmore, G.T.D. (1998). Documentation of rare and scarce plants in VC63 (Southwest Yorkshire). *YNU Bulletin* 29: 29-31.

Wilmore, G.T.D. (2002). Proposed documentation of rare and scarce plants in Yorkshire. *YNU Bulletin* 37: 32-34.

Wilmore, G.T.D. (2010). Geoffrey T.D. Wilmore: President of the YNU, 2009–2010. *YNU Bulletin* 53: 28–29.

Wilmore, G.T.D. (2011). 2010 Presidential Address: Alien Plants – An Ecological Perspective. *The Naturalist* 136: 3–14.

Wilmore, G.T.D., Lunn, J. & Rodwell, J.S. (2011). *The South Yorkshire Plant Atlas*. 459pp. Yorkshire Naturalists' Union & Yorkshire and The Humber Ecological Trust.

LH/AM

YNU Excursion Circulars 2019

CIRCULAR NO. 910

Divisional Secretary VC62: Anthony Wardhaugh
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The **VC62** excursion will be held at **Stockton Hermitage** on **Saturday 18 May 2019**.

Maps: 1:50,000 Landranger Sheet: 105 York and Selby.
1:25,000 Explorer Sheet: 290 York, Selby and Tadcaster.

Meeting Place: Meet at 10:30 at the rear (NW side) of the Hermitage YO32 9TL (SE65185772). Toilet facilities will be available on site.

Permission has been obtained from the landowner for the YNU Moth Group to trap on the night of Friday 17 May. Generators or batteries will be required because there is no power source available.

Reporting Meeting: tba.

The area: This meeting is taking place at the kind invitation of the landowner, Mr Nicholas McMahon Turner. Stockton Hermitage is a private estate where wildlife is a prime consideration and the meeting offers the opportunity to investigate a site not normally open to the public. Much of the estate is mixed woodland (Damhill Wood) which is of varying age with some open areas and rides. It has been classified as Ancient by the Environment Agency. There are several ponds of varying size both within the woodland and in more open situations. During a brief preliminary visit in August 2018 Common Darter *Sympetrum striolatum* and Southern Hawker *Aeshna cyanea* dragonflies were seen in flight. Butterflies included Small Copper *Lycaena phlaeas* and Brown Argus *Aricia agrestis*. A number of terrestrial molluscs and two common ground beetles, *Abax parallelepipedus* and *Pterostichus madidus* were noted. Birds seen within the woodland included Buzzard *Buteo buteo* and Tawny Owl *Strix aluco*.

The range of habitats present in the estate undoubtedly offer abundant scope for a field meeting and Mr McMahon Turner would welcome any records that can be provided.

Previous visits: None.

Hazards of the area: Footpaths through the estate are on level ground and hazards seem to be very few and of a minor nature. Care should be taken near some of the ponds where bank sides are sloping in places and may be slippery after wet weather. Access to the estate is direct from the A64 road where passing traffic is very fast. Care should be taken when entering and leaving the estate track at this junction.

CIRCULAR No. 911

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The **VC63** excursion will be to **Edlington Pit Wood,** near Doncaster on **Saturday 22 June 2019.**

Maps: 1:50,000 Landranger sheet 111
1:25,000 Explorer sheet:279 Conisbrough, Maltby & Thorne

Meeting Place: Meet in the car park for Edlington Pit Wood at SK547990 at 10.30. Leave the A1 at J36 and travel west towards Conisbrough. At the first set of traffic lights turn left to New Edlington. After about 200m turn left on Lord's Head Lane. At the T junction at the end of the lane turn right. The car park is first on the left.

Reporting Meeting: At Wadworth Village Hall at 16.00. From the Edlington Pit Wood car park, turn right and cross over the A1. Continue until the road veers left after a high green-wire security fence on the right side of the road and turn right at the junction. This road, Springwell Lane, joins the A60. At that T junction turn right to Wadworth village. In the centre of the village, the village hall is signed to the right up a narrow lane. There is a car park at the end of the lane in front of the church. The village hall is on the right.

The area: Edlington Pit Wood is an example of a colliery spoil heap restoration site, of which there are several in South Yorkshire. Mick Oliver, the Planning Officer responsible for its restoration, has given me information about the work which was carried out. This was one of the later restoration sites and so it benefited from lessons learnt from the earlier schemes. The main part of the renovation was carried out in the early 1990s as part of a 'Tip Washing Scheme' when the whole tip was excavated and re-washed on site to remove small particles of coal which could lead to spontaneous combustion. The oldest part of the tip did not have its soils stripped and stored for the purpose of later restoration prior to the tipping of colliery waste. The newer parts did, but there was insufficient soil to cover the whole tip. There were no toxic materials *per se* but the spoil was rich in minerals detrimental for plant growth. Water drainage is impeded, leading to some areas remaining wet allowing plants such as Round-Fruited Rush *Juncus compressus* to thrive in wet ditches. There are two ponds which, since this is a much-frequented site by the local public, are subject to disturbance, but aquatic plants such as rushes are established here. In the areas which received both sub soil and top soil woodland was planted with a variety of trees, both deciduous and coniferous. Patches of lichen clothe the branches and ground around the trees. The areas destined to become open areas were covered in a thin layer of sub soil to favour impoverished grassland. In some areas seed was spread which was harvested by a brush seed collector from a local nature reserve.

Now, 25 or so years after the restoration, plant and invertebrate life have developed in variety and abundance. We are visiting at a time when the open areas will be full of flowers including Ox-eye Daisy *Leucanthemum vulgare*, Cowslip *Primula veris*, Common Bird's-foot Trefoil *Lotus corniculatus* and Yellow Wort *Blackstonia perfoliata,* indicating that the soil used in the restoration was calcareous in nature. Bee *Ophrys apifera,* Pyramidal *Anacamptis pyramidalis*

and Common Spotted *Dactylorhiza fuchsii* Orchids are established in the thin soils. It has been mooted that the site could become a Local Wildlife Site and so any information which we can supply will be useful in that cause.

Edlington Wood SSSI is adjacent to the site. This broadleaved woodland comprises a variety of mature trees including: oaks, Sycamore *Acer pseudoplatanus*, Ash *Fraxinus excelsior,* Hazel *Corylus avellana*, Sweet Chestnut *Castanea sativa*, Field Maple *Acer campestre* and Yew *Taxus baccata*, with fallen and felled substantial timber. The ground flora includes Bluebells *Hyacinthoides non-scripta* and Spurge Laurel *Daphne laureola*.

A portion of the spoil heap, accessible by a bridge over the road, has received no soil and is now poorly-drained rough grassland with exposed mineral areas. These have yielded many interesting fossils, enclosed in nodules. These include Ammonites and a well-preserved Horse-shoe Crab, now in Doncaster Museum.

A previous YNU excursion in September 1891 cited the presence of Dormice in nearby Wadworth Wood, now long gone.

My thanks to Mick Oliver, Melissa Massarella and Colin Howes for their help with the preparation for this visit.

CIRCULAR No. 912

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The **VC64** excursion will be held at **High Batts Nature Reserve** on **Saturday 13 July 2019.**

Maps: 1:50 000 Landranger Sheet: 99 Northallerton & Ripon
1:25 000 Explorer Sheet: 298 Nidderdale

Meeting Place: We will meet in the reserve car park at High Batts (SE300764). The turning on the A6108 for the reserve is approx. 3.5 miles north of Ripon and ½ mile before the village of North Stainley when travelling north from Ripon. It is not far from Lightwater Valley Theme Park, so follow their brown signs. About half a mile after you pass the Park on your left and just over a rise in the road there is a right turn to a track marked for Hanson Quarry, which is the access track for the Reserve. Look out for YNU signs on the roadside. If you reach North Stainley you have gone too far. Follow the quarry track eastwards for about a mile, taking the right fork when the track branches, and then keep straight on until you come to the High Batts car park on your left. Do take care on the track as it is used by large quarry vehicles. Please note that all visits to this site are by prior arrangement only.

Tea and Meeting: This will be at 16:00 in the North Stainley Village Hall, HG4 3JT (SE287770). Vehicular access is via Watermill Lane, a right hand turn just before the playing fields. Follow the lane for 250 yds. over a small bridge and then immediately left into The Square, a one way

system to the hall parking area.

The Area: The underlying rocks of the area are Permo-Triassic calcareous mudstones and Magnesian Limestone dolostones. The softer deposits have been eroded to produce a gently undulating landscape dominated by the NNW/SSE valley of the River Ure, the floodplain of which is variously carpeted in Quaternary gravel and sand deposits. These deposits are currently being extensively quarried and the resulting gravel pits are broadening the range of habitats within the local area.

Set in an area of predominantly arable farming, the 32 acre (13ha) Nature Reserve borders the west bank of the River Ure and the main habitat is mixed broadleaf woodland of Ash, Alder *Alnus glutinosa*, birches, willows and in the past elms, with open calcareous grassland clearings and scrub. There are a number of ponds and a small stream. This combination has resulted in a diverse fauna and flora and regular surveys by various work groups have so far found and identified:

24 species of butterfly & over 500 species of moth
16 species of dragonflies and damselflies
5 species of amphibians

There are also regular bird ringing and mammal trapping projects.

The reserve was established and set up by High Batts Nature Reserve Charity Trustees in 1973 and it is managed by a dedicated team of volunteers in order to maintain and enhance its wildlife habitats and record the species present. In 1983 it was included as part of the designated 320 acres (130ha) of Ripon Parks SSSI of the Ure valley and nearby woodlands. The SSSI as a whole includes a combination of calcareous valley wetlands, permanent pasture, riverside woodland corridors and woodland patches. Wetland plants include Marsh Cinquefoil *Potentilla palustris,* Water Violet *Hottonia palustris* and Narrow Buckler-fern *Dryopteris carthusiana.* Base-rich wet areas support Bog Rush *Schoenus nigricans,* Butterwort *Pinguicula vulgaris,* Saw-wort *Serratula tinctoria* and Bird's Eye Primrose *Primula farinosa.* Notable colonies of Toothwort *Lathraea squamaria* occur here too. Drier wooded margins include Ash, Sycamore, Field Maple and elms with an understory of Spindle *Euonymus europaea* and Hazel. Ground flora includes Sanicle *Sanicula europaea,* and Yellow Star of Bethlehem *Gagea lutea,* as well as extensive areas of Bluebell and Cowslip. The dry calcareous grasslands support Salad Burnet *Sanguisorba minor,* Yellow-wort and Felwort *Gentianella amarella.* Amongst the Amphibians there are Smooth & Crested Newts *Triturus vulgaris* and *T. cristatus.* Local Invertebrates include a weevil *Limnobaris pilistriata,* a sawfly *Rhadinocera micans* and a bug *Acompus rufipes.*

Archaeological sites in the locality are sparse but are represented by several nearby large Neolithic henges, one at Hutton Moor to the southeast and a superb pair to the north at Thornborough, all accompanied by several tumuli that indicate that this was an area of widespread and flourishing early settlement. At Castle Dikes, just to the south of North Stainley, there are substantial earthen ramparts of probable Iron Age origin that were then refreshed for a Roman camp, and the foundations of a Roman Villa.

As part of its 'Review of Local Landscape Designations' in 2016, Harrogate Borough Council listed the Ure Valley in its Local Plan as one of nine Special Landscape Areas afforded long term protection.

The recent High Batts project called 'In at the Start' has won the national prize for community research projects in the Heidelberg Quarry Life Award 2018 competition. The project is centered on a major new quarrying extension by Hanson, adjacent to High Batts Nature Reserve known as Pennycroft. Working with Hanson, they have been monitoring and recording the changes on the working quarry and how species respond. All the data will go into helping to develop the plans for the eventual restoration of the site, so that they can maximize the potential for creating new habitats and conservation gain. High Batts Management recruited new teams of volunteers, provided training and support, and have been running public events for the local community in relation to the site as well as working with local schools to provide fun and learning opportunities through class visits and an After-School Club. As part of the project they have created 4.5km of survey track, converted a donated Portakabin to act as a volunteer base and built a mobile hide for use on the quarry site.

High Batts is also supported by regular activities of the following groups and their various newsletters and blogs include trip reports of visits to sites including High Batts:

Harrogate Biodiversity Action Group
Harrogate & District Naturalists' Society
Lower Ure Conservation Trust
Harrogate RSPB members group
Nidderdale Bird Watchers

The YNU Excursion is held at the invitation of the High Batts Management Committee who welcome our records and management advice. There was a VC64 YNU field excursion to High Batts on 18 August 1991. The report makes for fascinating reading [YNU Bulletin 1994 vol.22]; there were fledgling Great Spotted Woodpeckers that were still being fed, Mink footprints in the soft mud alongside the river; it was the most northerly site in Britain for the Double Kidney Moth *Ipimorha retusa* and the vast majority of the reserve was dominated by Wood Brome *Brachypodium sylvaticum*! It will be very interesting to compare and contrast what we find this year, twenty eight years later.

YNU Moth traps will be set up the previous night and examined early on the Saturday morning. The High Batts Mammal Group is also planning to set up their traps for a simultaneous trapping and analysis session.

References:

https:// highbatts.wordpress.com: the High batts Nature Reserve website
https://www.harrogate.gov.uk/downloads/file/1999/2016_october_-_review_of_local_landscape_designations
Report of 1991 Excursion: YNU Bulletin 1994 vol 22 pp.43-45
Ripon Parks SSSI Citation [https://designatedsites.naturalengland.org.uk]

CIRCULAR N0. 913

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The **VC65** excursion will be to the **Semerwater** area, Wensleydale (SD918866) on **Saturday 27 July 2019**.

Meeting place. Nr. Semerwater, parking at SD918866 (DL8 3DJ) near Low Blean Farm (for a small charge) before 10:30.
The Lepidoptera group is invited to trap in the area on 26 July (Friday night). Meet SD918866, no electricity supplies are available.

Maps: OS Explorer Map OL2 Yorkshire Dales, 1:25,000.

Reporting Meeting at 16:00, Location TBA.

The Area: Semerwater (SSSI & Ramsar Site) is a large nearly 1km long upland lime-rich lake, one of only two natural lakes in the Yorkshire Dales. Its glacial origin was at the end of the last Ice Age when huge amounts of glacial till blocked the outflow. This is indicated by the broad and deeply excavated lake-head, the terminal moraine which retains the lake and the presence of erratic boulders, notably the block of Carboniferous Limestone known as the Carlow Stone. It is fed by precipitous streams and is subject to dramatic changes in water level following flash floods. At mean summer levels the lake is only about 30–90cm deep along a 10–50m wide zone which follows the eastern, western and northern shores. In the centre, the lake was over deepened by the glacier to a depth of about 10m but overall it is shallow (average 2m deep). Its ouflow is the River Baine which flows north to the Ure. Crooks Beck takes the water from three feeder streams to the southeast and southwest through the nature reserve. The lake is moderately eutrophic with phytoplankton characteristic of rich waters. Currently the SSSI status of the lake is 'unfavourable' mainly due to excess phosphate and faecal organism levels ascribed to local agriculture.

An outstanding feature is the large number of mayfly species present, amongst which are several stream species including *Baetis rhodani* and *Habrophlebia fusca*. The White-clawed Crayfish *Austropotambius pallipes* used to occur in significant numbers and the large cladoceran *Leptodora kindti*, which is rare in Yorkshire, is present.

The level of the lake was lowered in 1937 by 55cm. This exposed a large area to the west which is now dominated by fen vegetation. When the lake floods back into the reserve during the winter it provides important foraging habitat for a range of wading birds and Whooper Swans from Iceland arrive.

The vegetation associated with the lake and the surrounding land demonstrates the stages in hydroseral development from open water to dry land communities. Here is a full range of habitats from open water with swamp plants: Bogbean *Menyanthes trifoliata,* Yellow Water-lily *Nuphar lutea*, Bottle Sedge *Carex rostrata*, Bulrush *Typha latifolia,* Common Club-rush *Schoenoplectus lacustris* and Water Horsetail *Equisetum fluviatile* are found along the shorelines. There are

areas of sedge, fen and reeds and marshy meadowland with Marsh Marigold *Caltha palustris*, Ragged-robin *Lychnis flos-cuculi* and Water Forget-me-not *Myosotis scorpioides*, through to fen, marsh and willow carr to developing Ash woodland on the driest part.

The eastern shoreline and western shore support stands of Water Horsetail, Yellow Water-lily, Common Club-rush and Bottle Sedge on the accreting silt. Willow carr has developed along the northwest shore. The willow species are challenging with many hybrids but Bay Willow *Salix pentandra* dominates.

There are areas of sedge fen with Bottle Sedge, Bladder Sedge *C. vesicaria*, and small beds of Common Reed *Phragmites australis* and Reed Canary-grass *Phalaris arundinacea*. The sandy shore supports a fine growth of Needle Spike-rush *Eleocharis acicularis* and an abundance of sedges dominate and it is here that the waders feed. The rushes on the site provide good nesting habitat for birds.

Land-based wetland communities include localised Bogbean swamp, extensive pasture dominated by rushes, mainly Soft Rush *Juncus effusus,* and marsh and meadowland containing herbs such as Marsh Marigold, Ragged-robin and Water Forget-me-not.

Wetland vegetation fringes the inflow river Crooks Beck for some distance upstream with further areas of tall fen vegetation and a wet area of alder/willow carr within which Greater Tussock Sedge *Carex paniculata* occurs.

The Yorkshire Wildlife Trust (YWT) manages a reserve of 37ha in three blocks, which we are invited to visit. The first is located at the south-western end of the lake. The remaining two land parcels known as Marsett Meadows are located upstream. All three sites are wet, species-rich meadows including fen, marsh, hay meadow, willow carr with developing Ash woodland in the drier areas. Much of the site is an old lake bed which still floods regularly and the YWT also controls a wedge of the lake to a central buoy. A belt of mixed Ash wood has been planted on the eastern boundary as part of a project to slow rainwater run off into the lake. On other sides are other small areas of woodland and hedgerow trees bordering the surounding pastures.

The two parcels of land known as Marsett Meadows provide cover for Snipe through the winter and are rich in flowers through the summer. In spring the site is of high value for a range of birds including Tufted Duck, Great Crested Grebe, Lapwing, Curlew and Redshank. In summer, the grasslands are species-rich including Devils-bit Scabious and birds such as Sand Martin, Willow Warbler and Reed Bunting can be seen and heard on site. In autumn migrants start to arrive on the site and in winter birds that are often seen include Wigeon, Teal and Snipe.

Once the ground-nesting birds have fledged the nature reserve is grazed with cattle and sheep and excess rush is cut in late summer when possible.

A fan of streams from the south merge amongst a large area of pasture and meadows 1km upstream of the lake. They flow into the lake as Crooks Beck. The largest of the three feeder streams, from the southwest, is Bardale Beck (= Marsett Beck). It rises from Fleet Moss, a large and extremely degraded area of blanket bog and hill peat surrounded by poor heather moorland. The central stream (Raydale Beck) mainly flows from the large coniferous Raydale

Plantation. Another large stream system flows in from the east. Cragdale Water has a very large upland catchment of blanket bog, heath and acid grassland, between Langstrothdale & Bishopdale.

Much of the valley area around the lake is covered by Pleistocene glacial drift (including several large drumlins) and alluvial deposits and recent formations of hill peat. The underlying solid geology is of Lower Carboniferous rocks most commonly the Yoredale cyclothems (of the Brigantean series) found in the uplands above the massive Great Scar Limestone which is restricted to a few exposures in the bottom of the adjacent Ure Valley. On the valley sides, especially to the southeast and northwest of the lake, are several limestone scars with 750m of exposed strata, including limestone beds from the Hawes Limestone up to the coral-rich Underset Limestone which dominates the hilltops. A borehole drilled on the southeast side of Raydale Beck (SD90268474) not far from Raydale House at an altitude of 268m O.D. proved the presence of a late Silurian (Caledonian age) granite batholith. This was named the Wensleydale Granite. The borehole penetrated 495m of Lower Carboniferous (Viséan) beds, mainly limestone beds until sandy dolomites and sandstones were reached on top of the granite, a sequence of beds from the late Asbian to the base of the Chadian (Dunham 1974).

Conservation: The condition of the lake and associated river system has been a concern for Natural England, the Environment Agency, the Yorkshire Dales National Park Authority and the local community for some time and since 2008 a number of projects have been implemented to try and address the key issues. Within the Raydale Project three of the most intensive farms have had nutrient management plans and two have had manure management plans. A kilometre of bankside fencing was installed and trees planted to increase shade. Several ghylls have been fenced out and trees planted where appropriate to reduce sediment loss and slow the flow of water.

Hazards of the area: there are some paths but much of the area is boggy and close to deep water and large streams. The latter are particularly hazardous after wet weather.

Previous YNU visits to the area
Over the years there have only been two YNU visits to the area

YNU Excursion 288 (19-10.8.1934) Askrigg/Semerwater
YNU Excursion 562 (20.8.1989) Stalling Busk & Semerwater

References

Dunham, K. C. & Wilson A. A. (1985) *Geology of the Northern Pennine Orefield: Vol. 2, Stainmore to Craven*. Economic Memoir of the British Geological Survey

Dunham, K.C. (1974) Granite Beneath The Pennines In North Yorkshire, *Yorks Geol. Soc*. 40 (2): 191-194.

YNU (1934) *YNU Naturalist Suppl*., 376: 59:

YNU (1934) *The Naturalist*, 59: 159-165.

YNU (1988) *YNU Bulletin*. 9: 29.

YNU (1989) *The Naturalist*, 114 (991): 150-151.

CIRCULAR No. 914

Divisional Secretary VC61: Sarah White
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The **VC61** excursion will be held at **North Duffield Carrs** in the Lower Derwent Valley on **Saturday 17 August 2019.**

Maps: 1:50 000 Landranger Sheet: 105 York and Selby
1:25 000 Explorer Sheets: 290 York, Selby and Tadcaster
291 Goole and Gilberdyke
294 Market Weighton & Yorkshire Wolds

Meeting Place: We will meet at 10:30 in the Natural England North Duffield Carrs car park at SE697366, off the A163 between Bubwith and North Duffield. There will be access on foot from here to North Duffield Carrs and North Duffield Ings, with transport to some of the more distant parts of this area kindly provided by Natural England.

Tea and Meeting: This will be at 16:15 at North Duffield Village Hall (SE686370, YO8 5RJ). From the meeting place, head west along the A163 and take the first turn right into North Duffield village (Back Lane). The village hall is on the left hand side. Modest contributions towards the cost of the hall and refreshments will be requested.

The Area: The Lower Derwent Valley National Nature Reserve is part of the Derwent Ings SSSI which comprises neutral alluvial flood meadows, fen, swamp and dyke systems associated with the River Derwent and the Pocklington Canal.

These grasslands represent one of the most important examples of agriculturally unimproved species-rich alluvial flood meadow habitat remaining in the UK.

The character and species composition of the grassland, fen and swamp communities is largely controlled by topography, differences in winter flooding and by the type of agricultural management.

In the wettest areas the vegetation is dominated by species such as Reed Sweet-grass *Glyceria maxima* and Reed Canary-grass; on drier areas, where flooding is short-lived, a species-rich alluvial hay meadow community is characterised by the presence of Meadow Foxtail *Alopecurus pratensis* and Great Burnet *Sanguisorba officinalis* (MG4) and includes the nationally-scarce Narrow-leaved Water-dropwort *Oenanthe silaifolia.* The freshwater dyke system also supports a rich flora including Greater Water-parsnip *Sium latifolium*, Flat-stalked Pondweed *Potamogeton freisii* and Water Violet, while the Canal contains the locally-rare Lesser Water-plantain *Baldellia ranunculoides* and Narrow-leaved Water-plantain *Alisma lanceolatum* amongst a number of botanical specialities.

The valley is important for a wide range of wetland breeding birds and in winter supports internationally important concentrations of wildfowl with nationally important numbers of Teal, Wigeon, Mallard, Pochard, Golden Plover and Ruff. Nationally important numbers of Whimbrel occur on passage in late April and early May, while breeding birds include Snipe, Lapwing, Redshank, Curlew, Quail, Barn Owl, Kingfisher, Yellow Wagtail and Reed, Sedge and Grasshopper Warblers.

The valley has an outstanding assemblage of invertebrates including up to 16 species of damselflies and dragonflies, notably the Red-eyed Damselfly *Erythromma najus.* More details, including the citations for the Derwent Ings, River Derwent, Pocklington Canal and Melbourne and Thornton Ings SSSIs may be obtained from the Natural England website.

Our visit is made by kind invitation of the Natural England Senior Reserve Manager, Craig Ralston, who welcomes YNU records and management advice for the area. Although by August the grassland areas will have been cut for hay, there will still be a range of interesting habitats for us to explore from the North Duffield Carrs car park, including rough grassland, scrapes, ponds and ditches, as well as mature willows and hedgerows. On the other side of the road, North Duffield Ings has an old railway embankment with mature willows, overgrown ponds and *Glyceria*-filled borrow pits. The Reserve Manager would particularly welcome our advice about how best to manage these more marginal habitats.

The Reserve Manager has also offered to arrange some moth trapping on the evening before our visit.

References:

Previous Excursions to the area were:
July 1968 (Pocklington Canal) *The Naturalist (*1968) no.907: 126-130
August 2004 (Wheldrake Woods) *The Naturalist* (2005) no.1055: 147-152
May 2010 (Pocklington Canal, Melbourne and Thornton Ings) *The Naturalist* (2011) Vol 136: 53-56.

The NNR Reserve Leaflet may be downloaded from:
http://publications.naturalengland.org.uk/publication/5099618681487360
Derwent Ings SSSI citation:
https://designatedsites.naturalengland.org.uk/PDFsForWeb/Citation/1002114.pdf

Links to NNR social media outlets:
http://ldvnnr.blogspot.co.uk/
https://www.facebook.com/pages/Lower-Derwent-Valley-Skipwith-Common-NNR/388893537806896
Twitter@LDV_NNR

YNU Calendar

Events for the coming months are shown below. Up-to-date information and further details can be found at www.ynu.org.uk/events, and the YNU Membership Card.

Apr	20	Marine and Coastal Section field meeting to Boggle Hole, NZ952037. Meet at 9.30 in the car park on Bridge Holm Lane.
	27	Conchological Section field meeting at Barton, N.W. Yorkshire, VC65, to survey for *Balea perversa* on walls in the village. Meet in village at NZ22960879 at 11.00.
May	4	Conchological Section field meeting at Malham, VC64, to survey for *Vertigo genesii*. Meet at Street Gate SD90486564 which is close to the site.
	4	Bryological Section field meeting to Sulber and Thieves Moss, VC64. Meet at 10.00 in the car park in Horton in Ribblesdale, SD807726.
	18	**VC62 Excursion to Stockton Hermitage**, Stockton-in-the-Forest, York. SE651577.
	25	Botanical Section field meeting to the Don Gorge, Sprotbrough, VC63. Meet 10.00 at the Waterbus Staithe car park, Nursery Lane, Sprotbrough. Grid ref SE537015. Nearest postcode DN5 7NB. **Note change of date.**
	19	Marine and Coastal Section field meeting to Sandsend, NZ860129. Meet at 9.30 in the car park next to Wits End Café (pay and display).
June	2	Conchological Section Sunday field meeting at Brockadale VC63 to survey for *Truncatellina cylindrica.* Meet in car park at SE51271734 at 11.00.
	22	**VC63 Excursion to Edlington Community Woodland**, Edlington, SK547990.
	28	Joint Entomological, Botanical and Freshwater Sections field meeting to Rushy Moor and Shirley Pool SSSI. Meet at 10.00. Access via entrance gate on eastern side of A19 at SE557123. Inform Louise Hill via louise.a.hill@gmail.com if you will be attending.
July	6	Marine and Coastal Section field meeting to Filey Brigg, TA120814. Meet at 11.30 ouitside Country Park Cafe (pay and display).
	13	**VC64 Excursion to High Batts Nature Reserve**, North Stainley SE300764.
	27	**VC65 Excursion to Semerwater,** Yorkshire Dales, SD918866.
Aug	3	Marine and Coastal Section field meeting to Selwicks Bay, Flamborough, TA253706. Meet at 10.30 outside the cafe in the car park (pay and display).
	17	**VC61 Excursion to Lower Derwent Valley NNR**, North Duffield Carrs and Ings, SE697366.
Sep	1	Marine and Coastal Section meeting at South Bay, Scarborough, TA049868. Meet at 10.00 at the car park off Sea Cliff Road.
	7	Conchological Section meeting to Marrick Park VC65. Meet in Marrick village at SE078982 at 11.00.
	25	Basic Field Skills Day for University of Leeds MSc students. St. Chad's Parish Centre, Headingley, Leeds.
	28	Bryological Section meeting to Battersby Crag, VC62.Meet at 10.00 on Green Lane, Ingleby Greenhow, NZ581062.
	28	Marine and Coastal Section meeting at Runswick Bay NZ809159. Meet at 8.30 in the car park (pay).
Nov	9	Natural Sciences Forum. Whitby Museum, Pannett Park, Whitby. 11.00 to 12.30.
	9	**YNU Annual General Meeting.** Whitby Museum, Pannett Park, Whitby, from 1.30 to 4.00.

Yorkshire Naturalists' Union

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The Naturalist

This publication is issued free to individual members of the Yorkshire Naturalists' Union and to Affiliated Societies. The Editorial Board of *The Naturalist* is currently:

J. Bowers, W. Ely, A. Millard, P. Simmons, D. Smith

Assistant Proofreader: **S. Millard**

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editor@ynu.org.uk

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- using any paragraph formatting and line spacings other than single.
- using tabs to tabulate information (please use MS Word table format).
- inserting any figures, graphs or plates into the text; indicate their proposed locations in the text and send them as separate files.

Good quality, high resolution images are very welcome and should be sent as .jpg files, with a separate MS Word file containing the caption and name of the person to whom the image should be attributed.

If electronic submission is not possible, contributions should be sent to Dr. A. Millard, Woodland Villas, 86 Bachelor Lane, Horsforth, Leeds LS18 5NF (Tel. 0113 258 2482).

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Copy Dates:
April issue - 14 February; August issue - 14 June; December issue - 14 October

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***The Naturalist* is printed by Swallowtail Print, Norwich**

ISSN 0028-0771

Yorkshire Naturalists' Union

Archer, M. (2019). The state of the Watsonian Yorkshire database for aculeate Hymenoptera: Part 2 - the twentieth century to the 1960s. *The Naturalist* 144: 38-46. Issue 1100. April 2019.

Appendix – Species first recorded from the 1900s until 1960s

Chrysidoidea	**Vespoidea**
Anteon brachycerum (Dalman)	*Ancistrocerus gazella* (Panzer)
A. ephippiger (Dalman)	*A. nigricornis* (Curtis)
A. flavicorne (Dalman)	*A. trifasciatus* (Müller)
A. fulvivventre (Haliday)	*Anoplius concinnus* (Dahlbom
A. gaullei Kieffer	*A. nigerrimus* (Scopoli)
A. jurineanum Latreille	*A. anceps* (Wesmael)
A. pubicrne (Dalman)	*Episyron rufipes* (Linnaeus)
Aphelopus melaleucus (Dalman)	*Evagetes crassicornis* (Shuckard)
Bethylus cephalotes Förster	*Formica lemani* Bondroit
B. fuscicornis (Jurine)	*Lasius mixtus* (Nylander)
Cephalonomia formiciformis Westwood	*L. umbratus* (Nylander)
Gonatopus clavipes (Thunberg)	*Leptothorax acervorum* (Fabricius)
G. distinctus Kieffer	*Methocha articulata* Latreille
G. lunatus Klug	*Mutilla europaea* Linnaeus
Cleptes semiauratus (Linnaeus)	*Myrmica lobicornis* Nylander
Elampus panzeri (Fabricius)	*M. sabuleti* Meinert
Omalus aeneus (Fabricius)	*Priocnemis gracilis* Haupt
Pseudomalus auratus (Linnaeus)	*P. schioedtei* Haupt
P. violaceus (Scopoli)	*P. parvula* Dahlbom
Chrysis angustula Schenck	*P. perturbator* (Harris)
C. ignita (Linnaeus)	*Symmorphus bifasciatus* (Linnaeus)
C. impressa Schenck	*S. crassicornis* (Panzer)
C. mediata Linsenmaier	
C. rutiliventris vanlithi Linsenmaier	
Hedychridium ardens (Latreille *in* Coquebert)	
H. cupreum (Dahlbom)	
Trichrysis cyanea (Linnaeus)	
Apoidea – Wasps	**Apoidea – Bees**
Argogorytes fargeii (Shuckard)	*Colletes fodiens* (Geoffrey *in* Fourcroy) *A. angustior* (Kirby)
Crossocerus annulipes Lepeletier & Brullé	*A. bicolor* Fabricius
C. binotatus (Van der Linden)	*A. clarkella* (Kirby
C. cetratus (Shuckard)	*A. denticulata* (Kirby)
C. nigritus Lepeletier & Brullé	*A. falsifica* Perkins
C. ovalis Lepeletier & Brullé	*A. fuscipes* (Kirby)
C. palmipes (Linnaeus)	*A. helvola* (Linnaeus)
C. podagricus (Van der Linden)	*A. humilis* Imhoff
C. pusillus Lepeletier & Brullé	*A. lapponica* Zetterstedt
C. styrius (Kohl)	*A. labiata* Fabricius
C. tarsatus (Shuckard)	*A. minutula* (Kirby)
C. walkeri (Shuckard)	*A. nigriceps* (Kirby)
Diodontus luperus Shuckard	*A. pilipes* Fabricius
Diodontus tristis (Van der Linden)	*A, praecox* (Scopoli)
Dryudella pinguis (Dahlbom)	*A. ruficrus* Nylander
Ectemnius cavifrons (Thomson)	*A. subopaca* Nylander
E. ruficornis (Zetterstedt)	*A. thoracica* (Fabricius)
Entomognathus brevis	*Anthophora furcata* (Panzer)
Gorytes quadrifasciatus (Fabricius)	*Bombus barbutellus* (Kirby)
Harpactus tumidus (Panzer)	*B. bohemicus* (Seidl)
Mellinus arvensis (Linnaeus)	*B. hortorum* (Linnaeus)
M. crabroneus (Thunberg)	*B. jonellus* (Kirby)

Apoidea – Wasps continued	**Apoidea – Bees continued**
*Mimumesa dahlbomi (*Wesmael*)*	*B. lucorum s.l*. (Linnaeus)
Nysson dimidiatus Jurine	*B. magnus* Vogt
Oxybelus uniglumis (Linnaeus)	*B. subterraneus* (Linnaeus)
Passaloecus corniger Shuckard	*B. sylvarum* (Lepeletier)
Passaloecus insignis (Van der Linden)	*B. sylvestris* (Lepeletier)
P. singularis Dahlbom	*Epeolus cruciger* (Panzer)
Pemphredon austriaca (Kohl)	*E. variegatus* (Linnaeus)
Psenulus pallipes (Panzer)	*Hylaeus brevicornis* Nylander
Rhopalum coarctatum (Scopoli)	*H. confusus* Nylander
Spilomena troglodytes (Van de Linden)	*H. hyalinatus* Smith
Stigmus solskyi Morawitz	*Lasioglossum cupromicans* (Pérez)
Trypoxylon attenuatum Smith	*L. fratellum* (Pérez)
T. clavicerum Lepeletier & Serville	*L. fulvicorne* (Kirby)
	L. laevigatum (Kirby)
	L. lativentre (Schenck)
	L. morio (Fabricius)
	L. nitidiusculum (Kirby)
	L. parvulum (Schenck)
	L. punctatissimum (Schenck)
	L. quadrinotatum (Kirby)
	L. rufitarse (Zetterstedt)
	L. smeathmanellum (Kirby)
	L. villosulum (Kirby)
	Megachile ligniseca (Kirby)
	M. versicolor Smith
	M. willughbiella (Kirby)
	Melitta leporina (Panzer)
	Nomada goodeniana (Kirby)
	N. roberjeotiana Panzer
	Osmia caerulescens (Linnaeus)
	O. leaiana (Kirby)
	Panurgus banksianus (Kirby)
	Sphecodes geoffrellus (Kirby)
	S. ferruginatus von Hagens
	S. hyalinatus von Hagens
	S. miniatus von Hagens
	S. pellucidus Smith